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VETERINARY MEDICINE

JANUARY CONTENTS 1948

Veterinary Progress, Policies and Comments

Storms of Brucellosis Caused by Boar, 1; Goat Losses from Contagious plueropneumonia in the Far East, 1; DDT in Poultry Ration Reduces Egg Production, 1; Increase in Tularemia in Illinois, 1; Gammexane Spray Not Effective Against Warble Fly, 2; Making Rabbit's Blood Lethal for Mosquitoes, 2; Benadryl Helpful in Poison Ivy, 2; Members of Faculty of Veterinary College of the University of California, 4; A Great Humane Program, 6; A Link with 19th Century Veterinary Medicine Broken, 3; A Glance Along the Backward Trail, 7; Grant for Study of Equine Infectious Anemia, 8; Hart's Portrait to Saddle and Sirloin Club, 8; Intercollegiate Meat Judging Contest, 8; Culture Rabies Vaccine, 8; Causes of Diarrhea in Young Calves, 8; A New Antibiotic Agent, 8; Famous Horses of the American Turf, 9; International Congress on Animal Production, 9; Foot-and-Mouth Disease in Mexico, 10; Veterinary Problems of the Fur Ranch, 13; Veterinary Problems in Poultry Production, 14; Special Sense Organs of Cats, 15; Fecundity of Bitch, Ewe and Sow, 15; Avian Pneumoencephalitis, 16.

Respiratory Ailments of Swine 21

Eradication of Bovine TB from Isolated Centers 17

Trichina Inspection in Germany 23

Sulfonamide Blood Concentrations in Mink 26

Formaldehyde a Blood Coagulent in Vivo 29

Veterinary Practice XII (Finis) 32

Clinical Report 33-38

Hydrometra in Two-Year-Old Cat, 33; A Rare Case of Carcinoma in a Dog, 33; A Living Two-Headed Calf, 34; Two Too Many Legs, 35; Surgical Correction of a Perineal Hernia, 35; Treatment with Streptomycin of Peritonitis in a Dog, 36; Cesarean Section in a Ewe, 36; Vertebral Chondroma of the Dog, 38.

Abstracts 39-40

History of Endocrinology, 39; Sulfamerazine Therapy in Fowl Typhoid, 39; Measles in Antelope, 40; The Enterotoxemias of Sheep, 40.

Book Reviews 41-42

Heads Up—Heels Down, 41; Bright with Silver, 41; Riding and Schooling Horses, 41; Proceedings of the Moscow Zoological Park, Volume III, 41; St. Paul's of I Am, 42; Management and Feeding of Sheep, 42; Kennel Building and Plans, 42; Useful Bulletins, Circulars etc.

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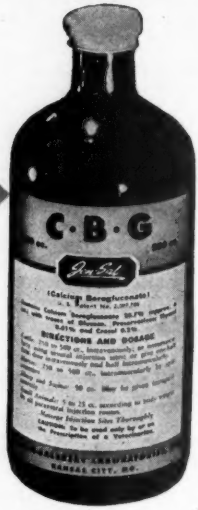

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The boar is the principal spreader of swine brucellosis, and is responsible for all "storms" of the disease.

A new class of antifilarial agents, the cyanines, when introduced into the blood stream, closely parallel atabrine, the leading wartime antimalarial, in action.

Laboratories of the Illinois State Department of Public Health last year made 24,160 tests for brucellosis (human) 8443 for tularemia and 5065 for rabies.

The Illinois Department of Public Health made an X-ray examination of the chests of 14,180 persons during the state fair last summer. The films were interpreted and a confidential report mailed to each person. The examination revealed 129 suspected cases of tuberculosis—nine of them advanced cases. A program of the Department includes an eventual X-ray of every adult in the state and elimination of the disease as a major public health problem in Illinois.

Contagious pleuropneumonia of goats caused enormous losses in the Far East during the war particularly in India where goats, collected in forward areas for slaughter for troops in Burma and Assam, died from it in great numbers, seriously endangering the principal source of fresh meat for the British Army. Notwithstanding the wide prevalence of this disease and the great losses it occasions it is seldom mentioned in veterinary literature.

Rubin and associate at Beltsville found that 0.031% of DDT in the poultry ration lowers egg production. Hatchability was impaired at 0.062% in the ration and 0.125% caused death of hens in 12 weeks.

In a controversy over the propriety and legality of artificial insemination, G. Lavalée in *Le Concours Medical* accuses French physicians of exaggerated haste in following in the wake of veterinarians.

English research workers fed iodinated casein to hens in the second laying year at rates of 5, 10 and 20gm per 100 pounds of ration. It did not increase egg production. These results do not agree with those reported by the Missouri experiment station in 1945.

There was a 200% increase in tularemia in Illinois during the past rabbit-hunting season, according to the state health department. R. P. Little, M.D., Columbus, Ohio, states that 90% of the cases of tularemia are occasioned by handling wild rabbits. To date 18,000 cases of tularemia (1300 of them fatal) have been reported in the U. S.

Para-aminosalicylic acid is the latest chemical to be recommended for the treatment of tuberculosis. At a Mayo staff meeting Dr. H. C. Hinshaw of the Mayo clinic, who has contributed much to the knowledge of the place of streptomycin in the treatment of tuberculosis, described the new treatment. PAS as the compound is called, is less powerful than streptomycin but has the advantage that it may be taken orally.

Swine brucellosis is self-limiting in the individual animal, but not in the herd.

In open cows infected with *Vibrio jejuni* estrus is quite regular; in *Trichomonas fetus* infection the estral periods are extremely irregular.

The chief value of sanitation in the control of bovine brucellosis lies in preventing partially immune animals from being overwhelmed by exposure to mass infection.

Brucellosis may stand fourth among the communicable disease of man; probably being exceeded in importance only by tuberculosis, syphilis and gonorrhea.—*Hygeia.*

Errata

There are two errors in the fourth paragraph on page 448 in the December issue of VETERINARY MEDICINE. In both places in that paragraph where pregnant mares' urine is referred to, pregnant mares' serum is meant.

In cases of estrual failure in cows, I give diethylstilbestrol, 30 to 40mg and mate at the first heat period. Conception occurs in 50 to 60% of the matings. I have experienced no cases of nymphomania following the injection of this synthetic hormone.—W. C. GLENNEY.

Unsworth and Edwards attempted to prevent warble infestation by spraying cattle with gammexane at weekly intervals throughout the fly season. The treatment was ineffective. Wells made the same attempt with DDT and reached the conclusion that it too is ineffective against the Hypoderma.

Eighteen of 30 shipments of Wisconsin cheese examined by the Food and Drug Administration were found to be filthy and "unfit for human consumption." In passing sentence a federal court scored the state department of agriculture for failure to enforce sanitary regulations.

Scientists in the USDA are reported to have succeeded in making a rabbits blood[1] lethal for mosquitoes without harming the rabbit. It was accomplished by feeding the rabbit subtoxic doses of an insecticide. Their hope is to find a way to make the blood of all domestic animals and man toxic to disease carrying insects that may bite them.

[1] Blood from rabbits fed gammexane proved fatal to sucking insects. *Vet. Med.* 42:3 (March), 1947.

A definition of the so-called practical man is a man who makes the same mistakes his father and his grandfather did before him.—GEO. F. BODDIE, M.R.C.V.S.

Three of 14 patients suffering from ivy poisoning were relieved of all symptoms and recovered completely in 72 hours from treatment with benadryl; the pruritus in the other 11 patients was relieved by 50mg doses at four to eight-hour intervals but the dermatitis ran the usual course.

A General to Head Army Veterinary Corps

Colonel James A. McCallam, V.C., present Chief of the Veterinary Division, Office of the Surgeon General of the Army, has been recommended by the Army selection board for permanent rank of brigadier general and the President has approved the recommendation. This will mark the first time in the history of the Veterinary Corps that an officer of that corps has been included on a list from which promotions will be made to general officer rank in the Regular Army. Colonel McCallam was recommended for brigadier general.

The only other time in the history of the Army Veterinary Corps that a member of that corps attained general officer rank was during World War II, when Colonel Raymond A. Kelser, who served as chief of that corps during the recent hostilities, was appointed a temporary brigadier general.

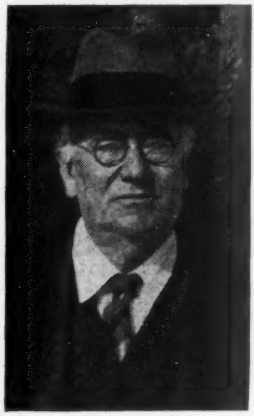
The selection of Colonel McCallam as brigadier general will be a most popular one throughout his corps. Colonel McCallam was appointed Chief of the Veterinary Division in the Surgeon General's Office on January 10, 1946.

Born in Philadelphia, Pennsylvania, on May 13, 1894, he received his veterinary degree from the University of Pennsylvania in 1917 and was appointed assistant veterinarian in the Veterinary Corps, Regular Army, with the rank of second lieutenant on July 16, 1917. Colonel McCallam graduated from the Army Veterinary School in 1924 and was an honor graduate of the Army Medical Field Service School in 1925. Going overseas March 30, 1943, he was with the Sixth Army in Australia, New Guinea, Leyte and Luzon in the Philippines, and finally as part of the occupation forces in Japan. He was awarded the Legion of Merit and the Bronze Star Medal for his service with the Sixth Army in the Southwest Pacific. During his military career, Colonel McCallam has served at various posts in the United States and in Hawaii.

A Link with 19th Century Veterinary Medicine Broken

Dr. J. W. Connaway, for many years Veterinarian of the Missouri Agricultural Experiment Station and head of the Veterinary Department of the University of Missouri, died October 5, 1947. Had he lived until November 18th he would have been 88 years of age.

Graduating from the Chicago Veterinary College in 1890 Doctor Connaway went to the Missouri experiment station and school in exciting times. Lying across the direct line of the cattle trail from the Texas ranges to the feedlots of Illinois and the packinghouses of Chicago, Missouri had suffered annual incursions of tick fever ever since the close of the Civil War. Every effort had been made, both



JOHN WALDO CONNAWAY

legal and extra-legal, to stop the entrance of Texas and Arkansas cattle into Missouri and armed conflict was by no means unknown. A part of the difficulty lay in the fact, that few believed, and none could convince a court, that healthy cattle from Texas could bring a fatal disease to Missouri cattle.

In the year that Doctor Connaway was graduated from veterinary college Kilborne, Curtice and Smith demonstrated that the cattle tick is the vector of Texas fever in cattle and, what was widely regarded as supremely preposterous that ticks, hatched long after the ticky cattle had passed and were forgotten, could convey the disease to cattle passing over the same trail. After repeating their experiments during two succeeding years, they published their famous bulletin in 1893.

For a decade and longer, prior to the classic research of Kilborne, *et al.*, Mark Francis in Texas; Paul Paquin in Missouri; Frank Billings in Nebraska and Dinwiddie in Arkansas were almost feverously investigating the mysteries of tick fever. Both Paquin and Billings usually came up with an answer each summer —a different one.

When Connaway succeeded Paquin, a cooperative experiment was undertaken by the Texas and Missouri stations under the directions, of course, of Francis and Connaway. The work of Kilborne, Curtice and Smith was confirmed step by step and a record of the experiment was published in January, 1897, as Bulletin 37 of the Missouri station. It carried much greater weight with the cattlemen than the Washington bulletin, because it was worked out by their own people in the cattle country. It also established a national reputation for Connaway as a research scientist. From that day on the word of Connaway was law on tick fever, everywhere. He was active in the organization of the Interstate (now U. S.) Livestock Sanitary Association. At early meetings he exhibited an exaggerated conservatism that remained with him for life. Although he had convinced others the tick was the transmitter of the disease he held out longer than anyone else against admitting cattle from below the quarantine line to tick-free territory after dipping in an acaricide.

In 1908 Doctor Connaway started the production of hog cholera antiserum and virus at the Missouri station and distribution of it direct to the swine raisers of the state. Missouri was the first state to undertake this madness, which ultimately spread to 21 other states, and the last to discontinue it. Over this matter Doctor Connaway broke with the veterinary profession of his state. Although much high class research continued at the Missouri station, the control of livestock disease shifted to the State Board of Agriculture at Jefferson City; demonstrating, has been shown repeatedly, that no one or dozen state officials can do much of anything about the control of animal disease in the state, without the cooperation of the veterinary practitioners.

Personally Doctor Connaway was one of the kindliest of men and an interesting conversationalist of broad information. In the first decade of the century he was a strong supporter of the Missouri Veterinary Medical Association. He was the author of several bulletins and numerous circulars from his station and of many articles in veterinary periodicals. Of recent years he had been in feeble health but he retained his keen interest in science and research.

Members of the Faculty of the Veterinary

C. M. Haring

W. H. Boynton

J. R. Beach

Jacob Traum

Clarence Melvin Haring, elected dean of the new California veterinary college in 1947, was born in Freeville, New York, and graduated from the New York State Veterinary College at Cornell University in 1904. He was a student assistant in anatomy during his junior and senior years. Going to the University of California in 1904 to become instructor in veterinary science and bacteriology, he became assistant professor in 1906 and professor and veterinarian in the experiment station in 1913. During the period 1920-24 he was Director of the California Agricultural Experiment Station.

Other positions held by Dean Haring include lecturer at the San Francisco Veterinary College, 1907-08; Captain in the Army Veterinary Corps in World War I; Consultant to the War Manpower Commission in World War II; Fellow in the A.A.A.S.; member, U.S.L.S.A., Research Workers in Animal Diseases of North America, A.V.M.A. (Secretary 1915-16), Society of Bacteriologists, California V.M.A., Phi Zeta, Sigma Xi, Delta Omega and Alpha Zeta. Dean Haring's interests have engaged broadly the field of animal disease.

William Hutchins Boynton, the only California-born member of the faculty, went one-half way around the world to first distinguish himself in pathology research and veterinary education. Graduated from the New York State Veterinary College at Cornell University in 1908 Doctor Boynton served the school in the capacity of instructor in general pathology for two years, before going to the Philippine Islands as comparative pathologist of the Bureau of Agriculture 1910-24. During this period he also lectured in the Philippine veterinary college 1910-14, was dean of the school, 1914-18, and chief of the laboratory of the Bureau of Agriculture 1918-24.

It was during this period that Doctor Boynton developed a rinderpest vaccine, which after several modifications enabled the veterinary service of the Island to eradicate the plague, thus contributing more to agricultural progress and prosperity than any other occurrence during the 40 years of American occupation of the Islands, perhaps more than all other introduced measures combined. Returning to California in 1924 Doctor Boynton became professor of veterinary science in the College of Agriculture and veterinarian in the experiment station. His membership in scientific societies includes, A.V.M.A., California V.M.A., Bay Counties V.M.A., A.A.A.S. and the honorary society Sigma Xi.

Doctor Boynton's research has traversed a wide field. In addition to the rinderpest vaccine already mentioned he developed a hog cholera vaccine (BTV) and a new method of diagnosing hog cholera. Other diseases investigated include contagious pleuropneumonia, anaplasmosis, equine infectious anemia, anthrax and stephanuriasis of swine. Bacteriophages were studied.

Jerry Raymond Beach was born in New York and graduated from the New York State Veterinary College at Cornell University in 1913. In the same year he accepted an offer from the University of California and was promoted through the grades to professor in the veterinary science division and veterinarian in the experiment station in 1931. Other activities have included, Guest Worker in the Rockefeller Institute 1930-31, delegate to the World's Poultry Congress at the Hague 1921 and at Leipsic 1936 and veterinary advisor to the Minister of Agriculture of China (1946). In this capacity he assisted in formulating plans for a rather elaborate system for animal disease control. His particular duties having to do mainly with planning central and regional laboratories for the manufacture and distribution of avianized rinderpest vaccine. However, because of the lack of trained personnel, only a start could be made at organizing the veterinary service. Of the large number of veterinarians stationed in China during the war and since Doctor Beach is one of only two or three who have published[1] an account of their experiences.

Doctor Beach was the first to recognize avian pneumoencephalitis in this country and the first anywhere to prepare a fairly successful vaccine for the prevention of the disease. His research has included virus, bacterial, parasitic and nutritional diseases of poultry. He is a member of the Poultry Science Association (V. P. 1921), A.A.A.S., A.V.M.A., Society of Bacteriologists, etc.

[1] *Vet. Med.*, 42:7, pp. 261-262 (July), 1947.

College at the University of California

W. R. Hinshaw

R. A. Bankowski

K. B. DeOme

O. W. Schalm

Jacob Traum was born in Gallicia (Austria) and graduated from the New York State Veterinary College at Cornell University (D.V.M. 1905, M.S. 1923). He served in meat inspection and field work of the Bureau of Animal Industry USDA, 1905-08 and in the Pathological Division of the Bureau 1908-14. Going to the University of California in 1914 as associate professor of veterinary science in the College of Agriculture he later became professor in the division of veterinary science and veterinarian in the experiment station, which position he still holds.

Doctor Traum's long career in research has been singularly productive. In 1911, a paper of which he was co-author with Dr. J. R. Mohler, then chief of the Pathological Division of the Bureau, was the first to supply evidence that the *Brucella abortus* is pathogenic for man. He was the first (1914) to describe the swine type of the Brucella organism *(Br. traum)*, which is named for its discoverer. He was the first (1916) to describe the so-called skin form of bovine tuberculosis (acid fast or tuberculoid skin lesions) and the first (1932) to report and describe vesicular exanthema of swine. He is still actively engaged, cooperatively with the B.A.I., on research on brucellosis, bovine tuberculosis and vesicular exanthema of swine. In 1925 he was one of a commission of three sent to Europe by the USDA to study foot-and-mouth disease. This commission spent a year in investigation of the disease at Carré's laboratory in Paris and at Strasbourg.

Doctor Traum with Doctor Haring, was far ahead of the B.A.I. in research on the use of vaccine in the control and eradication of brucellosis and in reporting it. Prior to the timid and limited endorsement of Strain 19 vaccine by the Bureau in 1940, Haring and Traum had freed large herds of the disease by the use of vaccine alone and the ordinary disposal of cows as they became unprofitable, and reported it.[2] In recognition of his contributions to our knowledge of brucellosis, tuberculosis and foot-and-mouth disease, Doctor Traum was given the Borden award for 1947 at the Cincinnati A.V.M.A. meeting last August.

William Russell Hinshaw was born at Traverse City, Michigan and graduated from the School of Veterinary Medicine, Michigan State College, 1923, Kansas State College (M.S.) 1926, Yale (Ph.D.) 1939. He was instructor in bacteriology Kansas State College 1923-27; assistant professor 1927; chief, disease control laboratory, University of Massachusetts, 1927-29; associate veterinarian, College of Agriculture, University of California, 1929-39; veterinarian 1939; associate professor 1940-46; professor since 1946.

Other activities of Doctor Hinshaw include: Chairman N.E. conference of laboratory workers in pullorum disease, 1928-29; chairman, section on pathology World's Poultry Congress, 1939; chairman poultry disease committee A.V.M.A. 1929-32; chairman poultry section 1930 and secretary of the section 1947-48; chairman, section on diseases, Poultry Science Association 1934 and 1937-39; chairman poultry disease committee U.S.L.S.A. 1926-28; member Conference of Research Workers in North America, Sigma Xi, etc. Doctor Hinshaw has published many articles on the general subject of poultry pathology including reports of research into the diseases of turkeys and avian salmonellosis.

Raymond A. Bankowski, born in Chicago, was graduated from the Michigan State College (D.V.M.) in 1938, University of California (M.S. in 1940 and Ph.D. in 1946). He held the position of assistant in the division of veterinary science 1938-40, associate in the experiment station, 1940-42, assistant professor in the division of veterinary science, and assistant veterinarian in the experiment station since 1946. His work has been chiefly in the field of poultry diseases.

Doctor Bankowski was a lieutenant colonel in the Army Veterinary Corps 1942-46. He is a member of the A.A.A.S.; A.V.M.A.; Research Workers in Animal Diseases; California V.M.A. and Sigma Xi.

Kenneth Benton DeOme was born and reared at Kalkaskia, Michigan, graduated from Albion College (A.B.) in 1928, Michigan State College

[2] *Vet. Med.*, 35:10, pp. 568-570 (October), 1940.

(M.S.) in 1934 and the University of California (Ph.D.) in 1938. He was instructor in animal pathology in the division of veterinary science of the University of California and junior animal pathologist in the experiment station 1938-43; assistant professor and assistant pathologist since 1943. His research has concerned mainly the neoplastic diseases of animals.

Doctor DeOrme is a member of the A.A.A.S.; Association for Cancer Research; Sigma Xi; Tau Kappa Epsilon; Gamma Alpha, etc.

Oscar William Schalm, born in Sturgis, Michigan, was graduated from the School of Veterinary Medicine, Michigan State College in 1932, and received the degree of M.S. from the University of California in 1933 and Ph.D. in 1935. He was assistant in 1932-36, instructor, 1936-40, assistant professor 1940-44, becoming professor in the division of veterinary science and veterinarian in the experiment station of the University of California 1944.

Doctor Schalm's major interests have been poultry pathology, especially respiratory diseases of poultry and bovine mastitis.

Hugh Stuart Cameron was born in Kirkcudbright, Scotland, and began the study of engineering in Glasgow. But his college work was interrupted in 1914 by the outbreak of World War I, in which he served in the Cameron Highlanders. He was severely wounded in the Battle of the Somme in 1916. He came to the United States in 1923 in charge of a shipment of Guernsey cattle and was graduated from the New York State Veterinary College at Cornell University in 1931, and from the graduate school with the degree of M.S. in 1932 and Ph.D. in 1935. From 1931 to 1936 he was an instructor in veterinary research at Cornell and 1936-46 assistant and later associate professor of veterinary science at the University of California, where he became Professor of Veterinary Science and Veterinarian in the experiment station in 1947. His investigations have dealt chiefly with bovine brucellosis, trichomoniasis and related conditions.

Doctor Cameron is a member of the A.A.A.S.; A.V.M.A.; California V.M.A.; U.S.L.S.A.; Research Workers in Animal Diseases; Society of Biology and Experimental Medicine; Sigma Xi and Phi Zeta.

Donald E. Jasper was born at La Grande, Oregon, and graduated from the Washington State College with the degree of B.S. in 1940 and D.V.M. in 1942, M.S., Iowa State College in 1944 and Ph.D., University of Minnesota in 1947. He was assistant in the clinic at Iowa State College 1942-44 and research fellow, University of Minnesota 1944-47. He was appointed to his present position, assistant professor in the division of veterinary science, University of California in 1947. His interest has centered chiefly in the diseases of the large domestic animals.

* * * *

Salisbury and Knott (Cornell University) conducted three experiments involving 8,498 artificial inseminations in cows to determine the effect of adding sulfanilamide at the rate of 300mg per 100cc of the yolk citrate diluent. The results were interpreted to indicate that the effect of sulfanilamide conduces to the fertility of bull semen used for artificial impregnation.

* * * *

A Great Humane Program

Whence came the weapons with which modern man fights nature's infliction of suffering, disease and death? Did any of them come from the antivivisectionists? Not one of them. They came from medical men and scientists. These are the workers who forged the weapons with which man fights smallpox, tetanus, anthrax, syphilis, tuberculosis, malaria and pellagra in man, and tick fever, blackleg, blacktongue and parasites of all sorts in his animals. The army of medical men and scientists on the firing line, in the service of supplies, and in the intelligence service asks the people whom it serves to protect that army in its fight against suffering, disease and death from the antivivisectionists who would deprive it of its weapons. It is preposterous that the medical men who have protected the public from birth, who have come to its rescue when nature struck at it with all the forces at her command, who have gone through the wintry night to sit at its bedside and bring it back from the shadow of death, should have to ask the public to protect it from the insidious attacks of a small minority of uninformed persons who ridiculously put out misrepresentations on the highly technical subjects of a medical science in which they are untrained and of which they are ignorant, but it is the inevitable weakness of democracy that highly vocal groups of persons may at will seek to impose their ideas on the public, and that numbers may outvote ability and competence.

The medical man must not only fight suffering, disease and death, but he must take from that fight the time and energy to fight ignorance and prejudice, the alien enemies who would tie his arms. And with characteristic logic the antivivisectionist resents the effort of the medical man and scientist to fight off these attacks. With astounding effrontery the leader of the antivivisectionists protested to the chairman of the senate committee in the District of Columbia at the hearing on the bill to prevent experiments on dogs, that government scientists came from their laboratories to oppose this bill which would stop their investigations of disease. Could illogical audacity exceed this assumption that scientists should sit abashed in their laboratories while women under the gonfalcon of humanitarianism labored to persuade Congress to undermine the legislation which charged these scientists with the study of disease and the development of control measures — Maurice Hall in *Scientific Monthly*, March, 1932.

A Glance Along the Back Trail

The best way to see where we are
Is to look back to where we were.

Having pointed to 1843 as the starting point of our present veterinary service and an outbreak of lung plague in Brooklyn as the exciting agency, the next reading ought to be a short lesson on the all but forgotten disease itself. The cattle disease modernly known as bovine contagious pleuropneumonia ran amok in the United States from 1843 to 1892 or, better to serve those who embrace history as a part of their learning, the visitation lasted exactly 50 years. Habitually, unto this hour, we boast of its extermination as a great achievement although it took 50 years, tremendous losses and a frightened population to do what could have been accomplished in one day's work and $40 had there been a veterinary service around Brooklyn when the first case was recognized. That's what Theodore Roosevelt meant when he said, "The American people act only on catastrophes." The first case occurred on Long Island in 1843 (exact date not published) and the last one was shot at Newark, N. J., March 25, 1892. Events in the *interim* gave birth to panic in the livestock field, a livestock sanitary service in the states, a federal bureau of animal industry, veterinary colleges and our profession.

The lung plague moved slowly and surely through New Jersey, Delaware, Maryland, District of Columbia, northern Virginia, the New England States, up-state New York, Pennsylvania, Ohio, Illinois and as far west as Fulton, Mo., all the while taking a toll in death losses that was intentionally hushed up rather than computed and published. The cover-up policy was unwisely pursued in the fear of grievous interference with foreign trade and trade between coastal and interior stockmen, not to mention the unpopularity of local quarantines. Much of the facts has to be read between the lines of the incomplete reports. Few had access to the warnings of Law (New York), Thayer (Massachusetts), Detmers (Ohio), and Paaren (Illinois), in the 1870's before there was a viable veterinary college in this country or a disease-control service based upon contemporary knowledge and custom. Lung plague history is one among other examples of neglect to develop a more complete mastery of animal diseases based on scientific knowledge. Maybe the present interest in veterinary medicine growing out of the world's food shortage is a sign of a better general understanding of the part animal health plays in the security of this civilization. One may well wonder whether it will outlast the current emergency.

It seems that lung plague fanned out from three coastal points: Brooklyn, Boston, and Baltimore. Taking scattered reports as the authority, it seems that the Brooklyn outbreak had spread to Connecticut, up-state New York, New Jersey by 1847. It came from England. Boston was contaminated by cattle imported from Holland in 1859. From there the infection spread through the New England States and probably New York. It seems probable that cattle from both England and Holland disembarked at Baltimore were responsible for the spread to Maryland, D. C., Virginia, New Jersey, Delaware, Pennsylvania, Ohio, Illinois, and Missouri.

The disease was pronounced conquered in New England except Connecticut by 1866, Ohio by 1884, Missouri by 1885, Illinois by 1886, Pennsylvania, Maryland, and the District of Columbia in 1889, New York and Connecticut in 1891, and New Jersey in 1892. The importance of these dates is what they imply in respect to our slow-motion veterinary service for 41 years (1843-1884) up to the time the Bureau of Animal Industry of the USDA was founded and the rapid film staged the following eight years (1884-1892).

Moreover, to keep lung-plague history straight, it must be remembered that the disease sprung from three sources (Brooklyn, Boston, Baltimore) each independent of the other. It is all wrong to blame everything on the Scotch-Irish dairyman who in 1843 put a sick cow into his herd that he had bought at a bargain from a ship's captain. The Massachusetts outbreak may have sprung from four cows from Rotterdam imported by Winthrop W. Chenery of Belmont. They arrived at Boston July 23, 1859. Another account, related by James Law in the late 1870's has it that Mr. Chenery had been losing cows from "something" since 1852. Anyhow, it was Mr. Chenery's herd that kindled the lung-plague flame in New England.

Another lung-plague episode for the record was the rumpus staged by the dairymen around the Shufeldt Distillery of Chicago in the 1880's when federal-state authorities quarantined the cows that had been exposed to the infected distillery herd. This was the first battle of record waged by stockmen against the control of animal disease—a prodrome of dipping-vat bombing, and pitchfork brigades against tuberculin testing.

The spread of bovine contagious pleuropneumonia was also a lesson on the importance of controlling the interstate shipment of farm animals. The shipment of coastal cattle to the interior was badly controlled.

$75,000 for Study of Equine Infectious Anemia

A grant of $75,000, in amounts of $25,000 a year for three years, has been made to the School of Veterinary Medicine, University of Pennsylvania, by the Grayson Foundation, Inc., for the study of equine infectious anemia.

The grant will go toward research in the development of improved methods of diagnosis, prevention and treatment of the disease.

The Grayson Foundation was named in memory of a celebrated turfman, the late Admiral Cary T. Grayson, U.S.N., physician to the late President Woodrow Wilson and Surgeon-General of the United States Navy.

Causes of Diarrhea in Young Calves

Dr. W. D. Pounden, Ohio experiment station, as a result of a survey reports that chilling is an important contributing cause of diarrhea in calves, less than 21 days of age. In a number of herds observed there was an average of eight cases of diarrhea in calves younger than three weeks of age when the temperature dropped below freezing, but an average of only one case in the same herds in a spell of mild weather.

Change of management routine is a second factor of importance in causing attack of diarrhea in young calves. Forty-one cases were first observed on the two days following weekends, but only 33 cases on the remaining five days of the week during the same period.

Hart's Portrait Joins Those of Livestock's Immortals

Dr. George H. Hart, UP '03, head of the Animal Husbandry Department, University of California was the guest of honor at the annual banquet of the American Society of Animal Production, in Chicago, November 30th, and his portrait was presented to the Saddle and Sirloin Club to hang in its gallery of heroes or husbandry "who, from farm and flock, grassland and granary, market and menu, have builded an unsurpassed husbandry."

Doctor Hart's portrait is the eleventh of a veterinarian to be placed in this internationally famous gallery, "At the sign of the Stock Yard Inn." Those whose pertraits have preceded his in the parade across the pages of livestock history and achievement are: William J. Butler, G. Howard Davidson, H. J. Detmers, James Law, Alonzo D. Melvin, John R. Mohler, Leonard Pearson, John G. Rutherford, Samuel E. Bennett and Daniel E. Salmon, The gallery contains also the portrait of Marion Dorset, M.D., who won this accolade in the field of veterinary medicine.

Another New Antibiotic Agent

Ainsworth, Brown and Brownlee of the Welcome Physical Research Laboratories announce the discovery of "aerosporin," made from a bacterium found in the soil and in Chicago tap water. It is effective against many organisms untouched by penicillin and, unlike antibiotic agents heretofore developed, it is not only bacteriostatic, but bactericidal as well.

A.V.M.A. Showing of Stallion Road

The motion pictures of scientific subjects at the Cincinnati meeting of the A.V.M.A. were largely of surgical operations. A notable exception was the showing of Stallion Road.[1] Through the kindness of Dr. Charles C. Reid, Hollywood, president of the California Veterinary Medical Association, who was technical adviser at the filming of the story, this film was shown to one of the largest audiences of the convention.

In the intercollegiate meat judging contest held in connection with the American Royal stock show at Kansas City in October and sponsored by the National Livestock and Meat Board a trio of University of Wisconsin students placed first and won the trophy. The team from South Dakota State College won second honors. The other teams in the contest finished in the following order, Oklahoma A. & M., Ohio S. U., U. of Missouri, U. of Nebraska, U. of Illinois, Kansas S. C., Michigan S. C., and Iowa S. C.

Culture Rabies Vaccine

A writer, in the *Indian Journal of Medical Research*, describes a rabies prophylactic vaccine made from an *in vitro* culture grown upon media containing sheep brain extract 1.5%, sheep serum 2%, glycine 2.5%, peptone 0.15% and distilled water 93.85%.

Advantages over the Semple vaccine, the antirabies treatment commonly used in India, are stated to be (1) Uniformity of virus content whereas the Semple vaccine varies greatly in this respect. (2) High virus content. The Semple vaccine, before inactivation, contains from 10,000 to 100,000 m.l.d. per cc. The culture vaccine is standardized at 2,500,000 m.l.d. per cc and because of its concentration can be given in minute doses and fewer of them over a shorter period. (3) Since the amount of nerve tissue in the culture vaccine is only one-fiftieth of that in Semple vaccine of approximate antigenic potency the danger of paralysis following vaccination is entirely eliminated.

[1] Stallion Road. *Vet. Med.*, 41:1, p. 42 (January), 1946.

Famous Horses of the American Turf

In 1788 when the grey stallion Messenger, charged down the gangplank onto a Philadelphia dock and up the street dragging two attendants with him following a voyage so strenuous that other animals in the shipment barely survived, the cornerstone of a hundred million dollar industry was being laid. No other animal imported before or after him has left such an imprint in the history of the light horse.

After a better-than-average racing career in England he was imported solely to sire running stock. His pedigree on the sire's side was in the purple; showing him to be but six generations removed from the famous foundation sire of the thoroughbred line, Darley Arabian through his most famous son, Flying Childers. The breeding of Messenger's dam has been hotly contested by the experts throughout the years, however the consensus is that the ability to sire trotting stock came through his dam, even though the sire of Messenger, Mambrino, was the head of the most popular family of coach horses in England.

Although not an exceptionally beautiful animal, Messenger was extremely impressive because of his masculinity and carriage. His head was too large and bony, his neck was short but his every move was characterized by force and vigor with a high tail carriage at all times. For his day he was considered a large stallion, standing 15¾ hands.

Within two years after his importation, the Pennsylvania legislature passed a law banning racing with betting. This law had much to do with him being bred later to native, cold-blood mares, where the trotting tendency asserted itself. He was not a failure as a sire of running speed for he was the grand sire of the famous American Eclipse, the famous thoroughbred that defeated Henry, the pride of the South, at Union Course, Long Island, May 27, 1823, the most famous match race held in America to that date. Estimates of the crowd at this contest ran up to 60,000 people. The owners had side bets of $20,000 each and the race consisted of three heats of *four miles* each!

After standing at stud a few years in Philadelphia Messenger was purchased and taken to Long Island, where thoroughbred racing had first been banned and where the new fad of developing fast trotters was in vogue. When bred to the trotting mares of that vicinity he soon proved himself to be a consistent progenitor of extreme speed at that gait. At this time extensive improvement of the roads stimulated the interest in driving horses, both for pleasure and for business use. Animals that proved too slow for the tracks found a ready sale as utility drivers.

Although the generally accepted fountain head of the American standard bred horse is Rysdyk's Hambletonian, a horse foaled in 1849, one fact must be noted, *i.e.*, that Messenger, the grey thoroughbred, imported from England 61 years before Rysdyk's Hambletonian was born, figures prominently on *both* sides of the latter's pedigree. Messenger died January 28, 1808, aged 28 years, after a siege of colic. His loss was considered so great that an impromptu firing squad was organized and volleys were fired over the grave of this popular horse, in the manner befitting a military hero.
—ISAAC E. HAYES, Waterloo, Ia.

International Congress on Animal Reproduction

The First International Congress on the Physiology and Pathology of Animal Reproduction and of Artificial Insemination will be held in Milan, Italy, June 23-30, 1948. The date chosen will permit those who wish to do so to attend the International Genetics Congress in Stockholm, Sweden, July 7-14 and the International Zoological Congress in Paris, July 20-26, 1948.

The holding of this congress has been promoted by the Instituto Sperimentale Italiano "Lazzaro Spalanzani" for Artificial Insemination and is endorsed by UNESCO (United Nations Educational, Scientific and Cultural Organization) and FAO (Food and Agricultural Organization).

Fifteen nations have already formed committees to promote the congress and have sent memberships to the Secretary General, and various Italian and foreign Universities have signified their intention of participating in the congress.

Anyone interested in animal reproduction may subscribe to the congress and it is hoped that, in addition to research workers, practicing veterinarians and livestock breeders also will participate in the congress.

Although the field of animal reproduction is largely unexplored, new ideas and methods of zootechnical improvement are being elaborated all over the world. Artificial insemination is of the highest importance and is receiving the keenest attention in most countries. Nevertheless genital diseases, low fertility, sterility, abortion and premature deaths take a fearful toll.

The Secretary General, Professor T. Bonadonna, Via Fratelli Bronzetti 17, Milano, Italy, solicits correspondence from persons in other countries who are interested in the subject of the congress.

Foot and Mouth Disease in Mexico

The effort to eradicate foot-and-mouth disease from Mexico was pushed with all possible speed during the past month but it is a task of such magnitude that it is little affected by what can be done in a month.

Heretofore the indemnity on cattle was paid by the United States and that on sheep, goats and swine by Mexico. October 3rd the plan was changed to provide that Mexico contribute 3,000,000 pesos ($600,000) monthly to the joint commission handling the eradication measures and the United States will contribute such additional sums as may be necessary. The number of infected or exposed cattle slaughtered to October 25th totaled 366,887. The average indemnity payment for cattle was approximately $50 per animal. The total of swine, sheep and goats slaughtered was 229,698, the average indemnity $4.67.

The United States Border Patrol now numbers more than 300. They confiscate, kill and bury or burn strays or other animals crossing the border illegally. Where burying is impracticable and fuel is scarce the carcasses are destroyed by smearing them with goop, a magnesium product obtained from the Army which burns with intense heat when it contacts flesh.

The plan of the USDA to purchase 50 million pounds of canned beef for European relief from new meat canners in northern Mexico has been implemented, as they say in Washington.

Some of the most interesting and indirectly illuminating information on the disease during the past month came not from Washington or Mexico City but from Buenos Aires.

La Res, a large and handsomely printed semi-monthly Argentine livestock journal, in its issue for September 20th, discusses editorially, the *Contra la Aftosa* as follows:

"Among the various ailments that afflict stock-breeding almost all over the world, foot-and-mouth disease continues to be one of the most serious; chiefly on account of its economic consequences because, fortunately, its incidence on public health is very much less to be feared than that of other diseases common to man and domestic animals.

"The latest example of the extraordinary seriousness of the losses caused by the disease is that of its appalling situation created in Mexico owing to a rapidly spread outbreak. The fight against the scourge went to the extreme of killing all infected stock.

"Adjoining the United States, and counting on the latter as an important market for the exportation of her livestock, *Mexico has found herself obliged to adopt the same measures in force in that country* to control the disease; and, as is well known, no other measure except total killing of all the infected herds is admissible there. By the application of the method, *it is claimed that the United States has been free of foot-and-mouth disease since 1929, and there can be no doubt that if such is really the case, it constitutes a strong argument in favor of the procedure.*

"But it is by no means certain that the measure can be carried out everywhere, and its generalization might quite possibly lead to the destruction of an excessive proportion of the already meager herds on which the world must rely for it precarious food supply. *La Res* has always supported taking up a resolute and energetic attitude as regards all domestic animal diseases, convinced that the care for the health of our livestock is the chief duty of the corresponding authorities, and that the best economic protection of the livestock industry consists in an efficient carrying out of that duty, because the control of the wider-spread diseases means the saving of millions of dollars per month to the stock-breeders. We have especially referred to foot-and-mouth disease on many occasions, asking for and supporting every measure tending to its control and to the wholesomeness of meat supplies; particularly—and for obvious reasons—those for exportation. And, it is only fair to recognize that *the precautions that have been taken for a long time back as regards all the meat for export—and especially as regards the care taken in the packing-houses—have been entirely satisfactory.*

. . . . . .

"The fact that the mortality due to the disease is, in reality, low, does not lessen the fact of the financial losses suffered by the stock-breeders whose herds lose a lot of time in getting fit for the market, while to these must be added two more: *the closure of the greatest potential market of the world, viz., the United States; and the, at times, malevolently utilized threat to the prestige of Argentine meat abroad.*
factory."

Italics in the foregoing are ours. There is much more of the editorial dealing mainly with vaccination for control of the disease in Argentina. However, without authority to slaughter and bury infected animals and to vaccinate those threatened with exposure vaccination at best will but reduce the losses.

It will be noted it is stated Mexico is obliged to follow the slaughter plan, not that Mexico willingly embraced that measure. There is no mention of the tremendous contribution of the United States to the eradication effort presently being made in Mexico.

The statement about the freedom of the United States from foot-and-mouth disease must be adjudged considerably less than all the truth. It must be known in the editorial office of *La Res* that the country has not only been free of the disease for the past 22 years but for 95 of the last 100 years.

As for the third italicized statement, it is doubted that livestock sanitary authorities in Britain, where Argentine meat has caused several hundred outbreaks of foot-and-mouth disease yearly since the beginning of the war, would agree the precautions taken in Argentine packing houses "have been entirely satis-

THE FOOT-AND-MOUTH DISEASE SITUATION IN MEXICO, OCT. 15, 1947

BASED ON REPORTS RECEIVED BY

THE FOOT-AND-MOUTH DISEASE SITUATION IN MEXICO, OCT. 15, 1947

BASED ON REPORTS RECEIVED BY U. S. DEPARTMENT OF AGRICULTURE

F&M Slaughter Program Abandoned

The announcement by the USDA, November 26, that the foot-and-mouth disease slaughter program in Mexico had been abandoned on that date for a program that includes "vaccination, quarantine and, when necessary, slaughter of infected and exposed animals," came as no surprise to readers of this magazine. That the original plan would have to be abandoned has been apparent since July.

It is reported "by a source usually reliable" that the proposal of the government of Mexico to abandon the slaughter policy was accepted by Under-Secretary Dodd over the objection of the veterinary officials of the Bureau of Animal Industry. Understandably the USDA foot-and-mouth disease advisory committee which is composed of representatives of the United States livestock industry strongly objected to the change in plans.

Vaccination as a part of the eradication program has been needed from the beginning. It would have been much better to have adopted it willingly for what it can contribute to the effort, than to have it forced on the joint commission by lack of progress with the slaughter policy. Perhaps it is to be used for what it can contribute to the eradication effort in the revised program, but those two words "when necessary" in the announcement raise the suspicion that slaughter may not be the rule for infected animals.

This foot-and-mouth disease outbreak in Mexico has had an unfortunate publicity from the start. The magnitude of the problem and the inherent difficulties deriving from a tropical climate, both jungle and mountain terrain, illiterate rural population, a foreign tongue and most of all the enormous extent of the infection when cooperative eradication measures were undertaken, were played down, when the public and the Congress should have been told it was the most difficult livestock sanitary task ever undertaken by any organization anywhere at anytime and the outcome was necessarily in doubt.

The dogmatic statement that vaccination would not be employed for six alleged reasons, not one of which rang the bell, was distressingly poor strategy. Opposition has little patience with a mind that announces in advance it is closed.

USDA news releases have consistently told less than the full truth. Usually the sugar-coated facts were given and the bitter left unreported, in a Peter Pan sort of drama. However, on occasion the official statements, because of omitted facts, and perhaps unintentionally, misled readers. An instance is the statement by Doctor Galloway, as to the inadequacy of vaccine against the type of foot-and-mouth disease virus involved in the Mexican outbreak. Naturally readers assumed the statement referred to the Waldmann vaccine, the standard product in use for the past 12 years. It now develops this news release referred to crystal violet vaccine; a new product in the experimental stage of development.

There is not occasion for pessimism in the official announcement of the revised program. An outbreak of foot-and-mouth disease in the milkshed of Rome, Italy, was suppressed in a few weeks by American Army veterinarians

Lesions of foot and mouth disease—Photo by Dr. Glen Grogan, 1915

by prompt vaccination. During the disastrous outbreak in Germany in 1938 several hundred vaccinated animals were placed in infected herds and it was reported that not one contracted the disease during the period during which immunity is supposed to last.

* * * *

It is generally assumed that eradication efforts in central Mexico will be materially lessened for the time being and measures will be augmented to strengthen an east-west quarantine line located some distance north of the infected area and extending from coast to coast. It is believed that barring possible carrying of the virus by migratory birds the disease can be held south of such a quarantine line indefinitely. Cattlemen in the Southwest do not entertain this view and are already prepared for the worst.

Veterinary Problems of the Fur Ranch

By T. T. CHADDOCK, M.S., D.V.M., Grafton, Wisconsin

Ten-Year Autopsy Study of Foxes

This report deals with the autopsies of 2482 individual foxes, in which it was found that death was due to 99 different causes. These results have been accumulated over a period of 10 years, on specimens that have been received from 19 different states within the United States and from seven provinces of the Dominion of Canada; from a total of 474 fox ranches. The long period over which this record was kept, the great extent of territory from which it was compiled and large number of autopsies included would seem to easily qualify it as being the much mentioned "cross section" of something or other.

The various causes of death and the number of animals dying from each in this group of 2482 dead foxes, are listed below.

Parasites

Hookworms *(Ancylostoma caninum)*	84
Lungworms *(Eucolius aerophilus)*	591
Roundworms *(Toxocara)*	115
Coccidiosis *(Isospora)*	5
Earmites *(Otodoctes cynotis)*	4
Mange *(Demodex folliculorum)*	33
Protozoan infection	1
Fleas	10
Trichinosis	3

Infectious Diseases

Distemper	210
Encephalitis	125

Dietary Disorders

Malnutrition	5
Food poisoning	27
Enteritis	35
Fatty degeneration of liver	173
Gout	1
Ricketts	1
Chronic dermatitis	2
Obesity	2
Chastek paralysis (vitamin B_1 deficiency)	22

Traumatic Injuries

Rupture of the liver	29
Rupture of the stomach	7
Rupture of the great aorta	2
Rupture of the heart	1
Rupture of the uterus	2
Rupture of the colon	1
Rupture of the spleen	1
Rupture of the bladder	4
Rupture of the cecum	2
Rupture of the mesenteric artery	11
Perforation of intestine (ingested twig)	1
Perforation of chest cavity	1
Fracture of the cranium	6
Fracture of the cervical vertebra	4
Fracture of the dorsal vertebra	4
Killed by penmates	66
Trauma (undescribed)	5

Neoplasms

Carcinoma of the duodenum	3
Carcinoma of the spleen	1
Carcinoma of the bladder	4
Carcinoma of the colon	1
Carcinoma of the lung	6
Carcinoma of the tongue	2
Fibroma of the skin	2

Miscellaneous Infections

Generalized infection	132
Bacteremia	17
Paratyphoid	5
Streptococcus	4
Staphylococcus	3
Clostridium welchii	2
Eschrichia coli	3
Salmonella	12
Meningitis	6
Abscess of the brain	3
Necrotic stomatitis	1
Abscess of the liver	4
Abscess of the neck	2
Peritonitis	4
Abscess of the throat	1
Pneumonia	184
Pleuritis	11
Endocarditis	3
Pericarditis	4
Vegetative endocarditis	1
Mastitis	2
Nephritis	65
Pylonephritis	10
Cystitis	70
Gastroenteritis	36
Metritis	16

Miscellaneous Causes

Hydrocephalus	13
Exposure	2
Suffocation	6
Exhaustion	1
Heat prostration	54
Casualty from vermifuge administration	63
Mucopurulent pneumonia	4
Jaundice	22
Fibrosis of the liver	3
Ulceration of gastric mucosa	7
Intestinal intussusception	9
Torsion of the ileum	1
Prolapse of the rectum	3
Diaphragmatic hernia	6
Umbilical hernia	1
Strangulated hernia	2
Cystic calculus	3
Uremia	2
Occlusion of ureter	1
Occlusion of urethra	11
Dystocia	7
Toxemia	12
Anemia	4
Inanition	2
Shot, escaped during storm	12
Thymustod	1
Congenital malformations (anal fissure)	4
Cretin	7

The foregoing classification is admittedly somewhat arbitrary. Some of the causes of death may fit almost equally well in two or even three classifications, however, the grouping is not important.

Veterinary Problems in Poultry Production

By W. R. HINSHAW, D.V.M., Ph.D., Davis, California

Caution in Use of 1080

The toxicity of sodium fluoroacetate ("1080" rodenticide) for White Leghorn chickens is reported by Cottrall, Dibble and Winton *(Poultry Science,* 26:610, 1947). They determined the following dosage levels:

Maximum tolerant dose—4.0 to 5.0 mg./kg.
LD 50—between 7.0 and 8.0 mg./kg.
LD 100—between 15.0 and 18.0 mg./kg.

Laying hens appeared to be more susceptible to "1080" than hens not laying. Compared with Kalmbach's *(Science,* 102:232, 1945) data on the toxicity of other animals, chickens are more resistant than many of the small mammals to "1080" poisoning. Kalmbach's list includes the following comparative LD 50 figures: domestic dogs 0.35; meadow mice, 0.5; deer mice 5.0; and wild black rats 0.1.

Most of the chickens used in these experiments, which were conducted at the U. S. Regional Poultry Laboratory, East Lansing, Michigan, showed symptoms of poisoning. The principal symptoms noted were cyanosis of the comb and wattles, depression, weakness, disinclination to eat, listlessness, distention of the crop with fluid and gas, edema of the wattles, dyspnea and moist rales. The number of hours to death after partaking of the poison varied from 34 to 58, and the percentage mortality from 0 to 100 depending on the dosage. For example, no birds died when given 3.0 or 4.0 mg./kg.; 9% died when fed 5.0 mg./kg.; 33% died when fed 7 mg./kg.; 82% died when fed 15 mg./kg.; and 100% died when given 18 mg./kg.

The most consistent necropsy findings were hemorrhage and edema of the lungs. Petechial hemorrhages in other tissues were also common.

The purpose of these studies was, of course, to determine how safe it is to use "1080" to kill mice and rats on a poultry farm. In this connection, the authors state that the solution used as a bait for mice contained ¼ oz. of the poison to each gallon of water. Since a mouse will drink about 1cc of the poisoned water, the dosage received is 1.87mg., or about one-half the tolerant dose for a two-pound chicken. If a chicken eats a poisoned mouse it probably will show poisoning symptoms but recover.

If a veterinarian is called upon to recommend "1080" to a poultryman, his client should be warned of the possible danger of accidental poisoning, not only to the fowls, but also to other animals including man. Dogs, as noted above, are very susceptible to the poison. It is very important that the poison baits used shall be kept out of poultry pens and yards.

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Air Borne Poultry Diseases

Dr. K. B. DeOme of the University of California, in a press release *(San Joaquin Valley Poultryman,* 18:3, June, 1947) on "Transmission of Air Borne Diseases" reports the successful air-borne transmission of infectious laryngotracheitis of chickens. In his experiments, susceptible normal chickens were exposed to infected chickens in a chamber in such a manner as to preclude direct or indirect contact except through the agency of particles small enough to pass through a fine wire screen. The susceptible birds became infected and subsequently developed the typical disease. Three hours exposure of infected birds to a non-infected environment was sufficient to contaminate the environment so that non-infected birds became infected when exposed to the chamber previously occupied by the infected individuals. Likewise avian pneumoencephalitis was shown by Doctor DeOme to be air-borne by a similar type of experiment.

Fowl cholera, and salmonellosis have previously been shown to be capable of being air transmitted. There is little question that further investigations will reveal that many of both virus and bacterial diseases of poultry can be air-borne. It therefore behooves the veterinarian to consider the various conditions which might influence air-borne infections when he outlines a control and prevention program for a poultryman. Dust in any of its various forms is probably the most important vehicle for transporting infection by air. Feathers, feed, litter and feces are the principal sources of dust, and any practice which will aid in reducing the dust problem will in turn aid in preventing spread of diseases from one section of farm or house to another. One must realize also that air-borne infections make the poultry disease prevention program a community problem in concentrated poultry rearing areas. As DeOme suggests, it is important that future research work be directed towards the redesigning of sanitary programs to eliminate insofar as possible the air-borne disease transmission hazard. It is equally important that we do not overlook other routes of infection. Natural carriers as sources of infection for all types of transmission must not be forgotten.

Special Sense Organs of Cats

Taste.—The organ of taste is situated in the corpuscles grouped about the lingual papillae. Near the base of the tongue there are two primary cup-shaped papillae with, nearby, very small papillae, the filiform papillae which cover the back and base of the organ. They are compound and covered with a thick corneal layer; between them, disseminated regularly, are seen the fungiform papillae.

Eye.—The cornea is circular in shape. The choroid shows a light golden yellow or greenish yellow coat around the optic papilla, green toward the periphery, and a dark coat of intense black. These two coats being separated by a band of indigo blue. The papilla, situated in the light coat, is more or less circular and also surrounded by a ring of indigo blue; retinal vessels (arteries and veins) are found supplying all the internal surface of the ocular shell. The crystalline lens shows an anterior surface more convex than the posterior, and its volume, 0.5cc, compares with that of the ocular globe in the ratio of 1:9.8. The iris is greenish in the adult and light blue in the young. The pupillary opening is round when dilated. When contracted it is elliptic from top to bottom and sometimes even reduced to a simple vertical slit. In darkness, the depth of the eye may appear phosphorescent. The ciliary body is very much reduced, and associated with the lacrimal gland is a Harder's gland.

Ear.—The concha of the external ear is short, pointed, almost triangular, stiffened and open toward the front. The middle ear possesses an excessively developed tympanic chamber, giving great delicacy to the hearing; the mastoid cells are found distributed in a special compartment of the tympanic chamber constituting the tympanic bulla; the other compartment contains the string of auditory ossicles. The internal ear with the labyrinth (vestibule, cochlea, and semicircular canals) presents no unusual feature; the cochlea makes three spiral turns.

Touch.—On the lower surface of each limb are found plantar pads of blackish color, six on fore feet and five on hind feet. The smallest or digital pads appear under each finger (with the exception of the pollux) at the level of articulation of the second and third phalanges. The largest are central, vaguely resembling a leaf. They are related to the metacarpo- or metatarso-phalangeal articulations, to which they are connected by very strong fibrous bands. The last or carpal pad is found at the level of the upper carpal or pisiform bone, from which it is separated by a small mucous bursa. The pads are comprised of connective tissue, elastic tissue, and fat; in them are highly developed sudoriparous glands and touch corpuscles. The claw is completely retractile, especially in the forepaws. It is formed by a horny sheath curved downward, and protected by a fold of skin. The claws are retracted without effort by an elastic ligament extending in each digit from the second to the third phalanx. To bring out its claws, the animal is obliged to contract its flexor muscles and, as soon as the voluntary contraction ceases, the claws pull back.

Among epidermal appendages are the whiskers also. They are genuine tactile organs, remarkable for a vascular sinus hollowed out of the fibrous follicular sac, which has on its internal surface a tactile ring which nerve terminals are concentrated.—From *Le Chat*, Vigot Freres, Paris.

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Nearly 750,000 tons of sulfite pulp, from which newsprint is made, were used during the war years to feed cattle in Norway, it was revealed at a recent London meeting of the International Chemical Congress. Two Norwegian doctors reported that bleached sulfite cellulose supplemented by protein was a suitable diet for cattle, but not for pigs. Chopped straw processed with a 1.5% sodium hydroxide solution was also found to be an acceptable animal feed.—*Nat'l Provisioner.*

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Fecundity of Bitch, Ewe and Sow

With the bitch as with the sheep and indeed most animals, which often or usually have more than one young in a litter, the number born depends mainly on the number of ova which are shed by the ovaries at the periods of estrus. In the sheep it had been shown that by the practice of "flushing" or feeding the ewes liberally upon additional stimulating foods at the approach of the tupping time, the number of ovarian follicles which ripen at a time can be increased and consequently the percentage of lambs born also can be increased.

The sow, however, differs from the ewe, in that the size of the litter depends less upon the number of ripe ova and much more upon the number of embryo pigs which survive in the uterus so as eventually to be born. The subject has been investigated by Hammond (1914, 1928) who showed that fetal degeneration is not due to bacterial infection since it commonly occurs in sows in which the uterus is entirely aseptic. And it does not result from overcrowding since the uterus of the sow is an organ with great power of distension, and the degeneration may take place in organs that contain relatively few fetuses; moreover, several dead fetuses may be situated near one

another in one part of the uterus, while another part may be full of living piglings. When the number of ova shed at estrus is greater than the average, the number of atrophic fetuses is also greater. It is probable that nutrition plays some part in determining the degrees of development that the fetuses reach and also the size of the fetuses, and it is noteworthy that atrophy may occur at all stages of development and that some piglings, though they are duly delivered at the end of the gestation period, yet are much below the normal size and often perish soon after birth.

Hammond compared the results with what he observed in some strains of rabbits in which fetal atrophy was found to be a recessive genetic character, and he remarked that since pigs are peculiarly susceptible to the ill effects of inbreeding, it is probable that in this animal, as in the rabbit, the death of the fetuses in the uterus may result, in part, from an accumulation of lethal or other detrimental genetic factors.—*Memoir No. 18 Univ. of Cambridge Schl. of Agr.*, p. 11. 1947.

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Avian Pneumoencephalitis

Avian pneumoencephalitis first made its appearance in Australia 17 years ago, in an outbreak in Victoria which threatened the poultry industry in that State. Prompt action by the local authorities proved effective (restriction in the movement of poultry, strict quarantine, and the immediate slaughter of all affected birds and in-contacts) and, although a second outbreak occurred a year or two later, the disease was finally eradicated in 1932 and, as far as is known, it has not reappeared.

For a few years prior to its appearance in Victoria avian pneumoencephalitis had ravaged the domestic poultry of Java, Philippine Islands, India and Korea, and had appeared in Newcastle, England. It was apparently first recorded in the literature in 1926 when Kranweld described the disease as it occurred in the Netherlands East Indies.

In the early reports avian pneumoencephalitis was described as a devastating plague, extremely infectious, with a very high mortality rate usually approaching 100% and, in the main, affecting domestic fowls, although observation in the field indicated the possibility that other species of birds might be susceptible. Except for minor differences in necropsy findings, the Victorian outbreak was comparable with those described in other countries and, until the control measures instituted by the local veterinary authorities began to take effect, there were ample grounds for considerable uneasiness on the part of poultry farmers and the community in general.

Little was heard of new outbreaks of avian pneumoencephalitis from early in the 1930's until 1940, when it appeared in severe form in Italy, and a year later in Germany, while it made its first appearance in South Africa in 1944 in the acute form which has been considered a characteristic of the disease.

In 1940 an apparently new disease of chickens appeared in California, U.S.A., the main features being respiratory and nervous symptoms and an average mortality rate of 20%. It spread through the greater part of California before the virus was identified. In spite of the fact that events of past and recent years in other countries led to the assumption that a spectacularly high mortality rate invariably followed introduction of the virus into a previously unaffected and susceptible population, the disease made its appearance in the U.S.A. in an entirely new guise. There is no doubt that its presence in America would have been detected very much earlier if the clinical manifestations had been typical. However, the American form of infection has now become so firmly established, not only in California, but in several eastern states that attempts at eradication by the usual method of quarantine and wholesale slaughter is of doubtful practicability.

The veterinary profession in Australia has been taught that the major plagues of livestock are exotic diseases as far as this country is concerned, and that vigilance must never be relaxed if the present position is to be maintained. Although it has been convenient to accept and memorize certain well-defined characteristics by which exotic infectious diseases may be readily recognized, it is to say the least most disconcerting to find that a disease with such potential destructive power as avian pneumoencephalitis can assume atypical characteristics and appear in a relatively mild form.

Rinderpest, swine fever and avian pneumoencephalitis have all appeared in Australia during the past 30 years and, because the diagnosis was promptly established in each case, successful eradication followed the institution of ruthless control measures. There might have been a different story to tell if these diseases had not appeared in the classical form.

Administrative officers and, in fact, all veterinarians can learn an important lesson from American experience with avian pneumoencephalitis in diagnosis, both in the field and at the laboratory; familiarity with current literature, and an alertness at all times are the best safeguards by which the freedom of this continent from exotic disease can be assured. —EDITORIAL in the *Australian Vet. J.*, 23:5, p. 104. (May) 1947.

The Eradication of Bovine Tuberculosis from Isolated Centers*

By E. V. MOORE**
Albany, New York

THE eradication of tuberculosis from isolated centers is one of our greatest economic problems in disease control today. A review of the record of our tuberculosis eradication program in this country and in New York State shows the great task that has been accomplished and stresses the necessity of ferreting out the last isolated case of this great enemy of the livestock industry.

Thirty years ago bovine tuberculosis caused the greatest economic loss, both actual and potential, to the dairymen and beef breeders in this country. Few cattle diseases are more ancient in origin, have spread over a larger portion of the earth's surface, are more chronic in nature or more insidious in their dissemination. Since 1882, when Robert Koch, a German bacteriologist, discovered the microorganism which causes this disease, the livestock industry has been planning some way to control it.

In 1917, a joint federal-state plan was inaugurated to eradicate bovine tuberculosis from the entire United States by the test-and-slaughter method, with indemnity payments to the owners for reactors. Many then believed that this would be impossible. No other country had ever attempted such a large-scale, disease-eradication program.

A statement compiled from the records of the Meat Inspection Division of the Bureau of Animal Industry, USDA, shows that in 1917 the carcasses of 195,488 cattle were retained because of tuberculosis; of these 40,746 were condemned. This indicates how frequently advanced cases of tuberculosis was found among animals sent to federally inspected packing houses. Many animals in the advanced stages were not shipped to such establishments as there were other slaughterhouses that did not have federal inspection where questionable animals could be consigned. During the same year, 76,807 carcasses of hogs were condemned for bovine tuberculosis. These figures give but a partial idea of the magnitude of the economic loss from bovine tuberculosis in this country in 1917, since they represent only the losses of animals slaughtered in establishments that were under federal meat inspection. The enormous economic loss that dairymen and breeders suffered because of bovine tuberculosis, at that time, will never be known.

H. R. Smith, general manager of the National Livestock Loss Prevention Board stated: "The Federal meat inspection records, which give us a true picture of conditions, show that in 1916, the year before the national tuberculosis eradication campaign was started, 2.35% of all cattle slaughtered had tuberculosis lesions. By 1943, only 0.048% of all cattle slaughtered under Federal inspection showed lesions and were retained for the disease—a reduction of 98 per cent from the 1916 figure. The number of beef carcasses condemned has been reduced from 40,746 in 1917 to 1,248 in 1943, a reduction of 97%."

In addition to this great economic loss, bovine tuberculosis also caused considerable infection in mankind, the full extent of which was not recognized until recently.

A great educational campaign was required preceding the actual program, since many responsible persons, including breeders, opposed the testing procedure. It took 30 years and 250 million dollars appropriated by the federal, state and the county governments to bring this disease under control; reducing the national percentage of infection to less than 0.25%. Nearly four million reactors to the tuberculin test have been slaughtered; one-fourth of them originated in New York State.

In New York State, such an eradication campaign threatened to be particularly hazardous to the dairy industry because of our large cattle population and high percentage of infection. This state has spent more than $60 million in addition to the millions spent by its counties and the federal government to reduce the average infection from 26.6% to 0.15%. In New York State—and I assume this to be true throughout the United States—the decrease in the number of reactors and the marked lowering of the percentage of infection have created the impression that bovine tuberculosis is eradicated and our Bureau of Animal Industry has been relieved of most of its work in connection with this disease. This is far from the truth. Bovine tuberculosis is still a threat to our livestock industry. The conservation of tuberculosis-free herds is just as important as their creation. They must be retested regularly to prevent serious re-infection. As evidence of the need for constant vigilance: During the fiscal year ending April 1, 1947, we tested 51,917 herds comprising

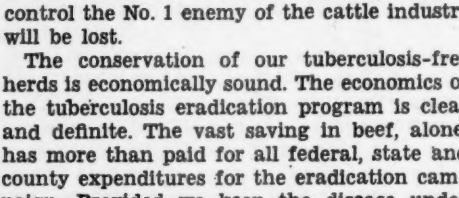
*Presented December 5, 1947, at the 51st annual meeting of the United States Livestock Sanitary Association, Chicago, Illinois.

**Assistant Commissioner of Agriculture and Markets of New York State.

1,186,232 cattle, of which 1835, or 0.15% reacted.

It will take longer to eliminate the last 100 reactors from our herds than it did to remove first million. This campaign will not be so spectacular as was the earlier one but it will be a great service to the livestock industry. We must check our herds constantly, until the last reactor is removed. If this is neglected, the disease will re-establish itself in a few years and all the effort which has been expended to control the No. 1 enemy of the cattle industry will be lost.

The conservation of our tuberculosis-free herds is economically sound. The economics of the tuberculosis eradication program is clear and definite. The vast saving in beef, alone, has more than paid for all federal, state and county expenditures for the eradication campaign. Provided we keep the disease under



During the fiscal year ending April 1, 1947, of 1,186,232 cattle tested, 0.15% reacted

control, this saving will continue to pay for the program over and over again in the years to come. In other words, the great economic saving to the livestock owners and the benefit to the human family because of a safe milk supply really have cost nothing. Tuberculosis eradication has been a paying investment and a great tribute to the livestock officials and the army of veterinarians who made it possible. It is the first time that any contagious disease of such widespread and vast economic importance has ever been brought under control in an entire nation. It is a perfect example of what well-organized cooperative control measures can accomplish. All the cooperating groups are to be congratulated for accomplishing what seemed to be an impossible task in 1917.

The federal meat-inspection records show that animals retained for tuberculosis increased 300% from 1908 to 1917. This shows how rapidly tuberculosis spread in the livestock of this country in nine years. If the national program of eradication had not been inaugurated in 1917, our situation at the present time would be similar to that in England today. L. Jordan, of the British Medical Research Council, states, "No less than 30% of the cattle in England are affected by tuberculosis. In England, 5.2% of all deaths in man, due to tuberculosis, are the result of the bovine tubercle bacilli and 25% of the deaths from non-pulmonary tuberculosis are due to the bovine type of the organism. Milk samples from various cities show virulent tubercle bacilli in from 2.9 to 11.1%." In his "Bovine Tuberculosis in Man" written in 1937, A. Stanley Griffith of the British Royal Commission on Tuberculosis states, "It is impossible to compute how many persons have died from infection with the bovine tubercle bacillus since 1911, or what it has cost or is costing in providing institutional treatment for crippled and in other ways incapacitated human beings. When to all this are added the economic losses from bovine tuberculosis among animals, the tribute paid to the bovine bacillus must be enormous."

We must not let our conditions revert to those in England; we must maintain the economic advantage we have won in controlling bovine tuberculosis. We have only to look at the record to appreciate the ground that has been gained. The death rate in man from pulmonary tuberculosis was 22.5 per 100,000 population in 1917. This had been reduced to 2.4 per 100,000 in 1945. During the same period, federal meat-inspection figures show, as has been stated, that the number of cattle condemned has been reduced from 40,746 to 1,248, which is a reduction of 97%. The same records show that the number of hog carcasses condemned for tuberculosis had been reduced from .19% in 1917 to .022% in 1943.

The small percentage of cattle which now harbor the infection can recreate an extensive disease situation in a very short time. In New York State we are trying to accomplish the eradication of the disease from the herds in which it still exists. We have realized for some time that when the routine testing procedure is applied to such herds, it sometimes fails to reveal all of the open cases of tuberculosis.

Our Bureau of Animal Industry, in a cooperative program with the New York State Veterinary College, secured the services of Dr. Alexander Zeissig to study our tuberculosis eradication problems in New York State. Doctor Zeissig, then Bacteriologist at the Veterinary College but now associated with the New York State Department of Health, has been very helpful to us in planning a campaign to control bovine tuberculosis in this state. His report states:

Participating in the post-mortem examination of the animals studied in this project soon taught us three things: First, reactors from herds subject to routine testing in clean areas prove on post-mortem examination to be mostly no-vis-

cial procedures. Experience extending over a period of two years has convinced us that the field control of tuberculosis should be similarly divided.

The following procedures based on this experience are recommended.

A. Routine Testing of Presumed Uninfected Herds

As long as tuberculosis continues to exist anywhere, there is always a degree of possibility of an infected animal being introduced into a herd due to the interstate and intrastate traffic in dairy cattle. In order to detect these infected animals as soon as possible, routine testing of all herds of cattle should continue.

The accredited veterinarian conducting a tuberculin test on a presumed uninfected herd is placed in a difficult position if he encounters reactions. Unfortunately, cows do not oblige by reacting either positively or negatively in a clear-cut fashion. The swellings presented to the veterinarian for his judgment range from the slightest enlargement at one extreme to the other extreme of fist-sized swellings in which there are hemorrhage and necrosis. The latter are true tuberculin reactions due to a tuberculous infection. Experience has taught us that animals, in which such severe reactions are seen, show evidence of recent infection on post-mortem examination. They are at the peak of the allergic state. Such reactions present no problem. The less conspicuous ones, however, either may be observed in an animal in which the allergic state has been dulled, as in one extensively infected, or they may be due to sensitization with some other organism related to the tubercle bacillus. The veterinarian must decide which of these causes is responsible. We propose that the term "reactor" be applied to those reactions of unquestioned nature, and suggest that the term "deviator" be applied to those the significance of which is doubtful.

We propose that:

1. All reactions, regardless of size, be recorded on the test chart.

2. If the accredited veterinarian would like assistance in interpreting the reactions which he observes, he be urged to seek consultation from a colleague or an official veterinarian.

3. The situation in each herd be thoroughly studied and evaluated before a decision is arrived at.

We suggest the following guiding principles:

Where Reactors Are Found

If there is an unquestioned tuberculin reaction in any individual, all of the animals in the herd which show swellings of any size whatever, including deviators, should be condemned. The animal with the smallest reaction may be the open case which caused the outbreak.

Where Only Deviators Are Found

a. Search carefully for skin lesions. If these are found in all deviators, the animals may be safely recorded as suspects and left in the herd.

b. Deviators without evidence of skin lesions, in practically all instances, can safely be left in the herd.

c. All deviators left in the herd shall be recorded as suspects.

d. They shall be retested on the opposite side in 60 days. On this retest animals infected with tuberculosis will usually react as well or better than on the original test. On the other hand, in animals which would prove to be no-visible-lesion cases on post-mortem examination, the reaction, being of a temporary nature, will either fade or disappear altogether.

e. The final decision on the status of the animal shall be based on this 60-day retest.

f. Where suspects are passed clean on this 60-day retest, the entire herd should be retested one year after the date of the original test. This should be done even though herds in that area are ordinarily retested at greater than yearly intervals.

4. Herd status shall be based on the results of the post-mortem examination of the reactors slaughtered. For example, if reactors from an accredited herd fail to show lesions of tuberculosis on post-mortem examination, the accredited status of the herd shall continue without retest.

B. Special Testing of Known Infected Herds

Routine testing of known, infected herds is entirely inadequate to solve the problem of finding the open case. These herds require special attention. They should be in charge of a specialist who will work with the accredited and local official veterinarians in solving this problem. Such a specialist will develop skill kept keen by the experience obtained in frequent observation of true tuberculin reactions. He must also exercise considerable ingenuity in searching for the source of the infection.

We recommend that:

1. The known, infected herd must be placed under the strictest quarantine. Animals removed must be slaughtered immediately.

2. The post-mortem examination of reactors should be observed, if possible. If this is not done, the post-mortem reports should be carefully studied in an effort to determine if an open case was included in the original reactor group.

3. The herd should be subjected to special tests, such as the cervical or a modified subcutaneous.

4. The specialist should actually observe the post-mortem examination of all reactors which are removed from known infected herds. This is the only way that he can evaluate what he has accomplished by his testing and this practice also gives him a basis for deciding his future course of action.

5. Cattle with open lesions are almost always the source of infection. However, in rare instances where special tests (under 3) fail to reveal an open case in the herd, the possibility of a human source of infection should be investigated. Sometimes this search, too, proves fruitless. In one instance in a problem herd which formed part of this experiment, a dog was found to be responsible.

6. The entire purpose of this work with problem herds should be to find and eliminate, the open case of the disease. All too frequently this animal does not react to routine tests and sometimes she gives only a slight reaction even with the special tests.

C. Post-Mortem Examination

1. The post-mortem examination of reactor cattle should be observed by all veterinarians at every opportunity. If the accredited veterinarian can not do this, then the official veterinarian responsible for that area should be present.

2. Meat-inspection reports contain only data required for the disposal of carcasses. They are not satisfactory for disease-control work. They should be altered to include the necessary infor-

ible-lesion cases; second, most reactors from known infected herds show evidence of recent infection, the open case responsible being only occasionally found among them; third, the only way for one to comprehend what the tuberculin test one has conducted has accomplished is to observe the port-mortem examination oneself.

Two distinct problems became clearly defined: First, to reduce the slaughter of no-visible-lesion cases from noninfected herds, which objective we found retesting would accomplish; and, second, and more important, it was obvious that routine testing was usually inadequate to detect the open cases in infected herds. We undertook studies in such herds to evaluate spemation, or a special supplementary form should be provided for the livestock sanitary official on which the information he needs would be recorded. The disease-control official is interested in whether or not the case was open, even if the tuberculosis is local. He would also like to know whether the animals slaughtered represented recent infection or whether the infection was of long standing. He would thus be in a position to gain some insight into the situation he faces in trying to eradicate tuberculosis from the herd.

In our Bureau of Animal Industry we have been following these recommendations of Doctor Zeissig in our problem herds, and the results have proved them to be both practicable and effective. We are concentrating on herds where bovine tuberculosis is known to exist, and at the same time are testing all the cattle in the state at least every three years.

We believe that our program is sound and that we are making progress. The bovine tuberculosis control situation, in New York State at least, is like a forest fire that has been stopped by heavy rain but in which big logs are still smoldering. They can burst into flame after a few days of dry weather and sunshine and recreate the forest fire. I hope that all the agencies which brought bovine tuberculosis under control in this country will reunite in a final effort to extinguish the last remaining sources of infection. Constant vigilance is the premium we must pay to insure perpetuation of our present favorable economic position.

Cattle Grub Control Is Food Conservation

Control of insect pests on livestock is one of the measures necessary to get the greatest benefit from feed consumed. The presence of considerable numbers of cattle grubs in the backs of beef animals may interfere with their normal fattening and the animals may not finish as well until the grubs have been removed. Numerous grubs in the backs of dairy cattle also may reduce milk flow.

Rotenone is the only material recommended by the B.A.I. for cattle grub control. It is safe, effective, and has proved its value through extensive use over a period of several years. Although rotenone was scarce during the war, a larger supply is now available. Large numbers of cattle will be treated with rotenone during the next few months.

Bureau entomologists give the following recommendations for the use of rotenone in controlling cattle grubs:

Spray.—Use 7½ pounds of 5% rotenone-bearing derris or cube powder to 100 gallons of water. Apply with a power sprayer at 400 pounds pressure. Use one gallon of spray per animal, holding the spray nozzle 12 to 16 inches from the backs of the animals. This is the treatment most commonly used.

Wash.—Use 12 ounces of 5% rotenone powder and four ounces of granular laundry soap to one gallon of water. Apply about one pint per animal, rubbing it into the back thoroughly.

Dust.—Mix thoroughly one part of 5% rotenone powder with two parts of pyrophyllite or Tripoli earth. Use about 3½ ounces of dust per animal, rubbing it into the hair and grub openings with a stiff brush.

Dip.—Use 10 pounds of 5% derris powder and two ounces of sodium lauryl sulfate to 100 gallons of water. Hold the animals in the dipping vat for two minutes.

Iodine Deficiency in Sheep and Swine

Considerable difference of opinion exists in the literature as to whether domestic animals in Indiana and neighboring states should receive supplementary dietary iodine, according to F. N. Andrews, Department of Animal Husbandry, Purdue University, Indiana, who presented a report at the annual meeting of the American Society of Animal Production November 29, 1947.

In a study to determine the iodine deficiency in newborn sheep and swine, Andrews and his associates studied the anatomy and the iodine content of the thyroid glands of over 300 newborn lambs and more than 400 newborn pigs in Indiana sheep flocks and swine herds.

Pregnant ewes and sows were fed commonly used rations with and without iodized salt over a three-year period. The normal thyroid of the newborn lamb is reported to weigh between one and two grams and to contain between 0.2 and 0.3% iodine on a dry weight basis. Of 234 lamb thyroids studied by the Purdue men, from ewes fed rations not supplemented with iodine, 55% weighed more than two grams, and only 3% contained more than 0.2% iodine.

Only 12% of the glands appeared normal histologically. Similar increases in thyroid size, and reductions in iodine content were observed in newborn swine. The use of stabilized iodized salt reduced the occurrence of these changes. The commonly recognizable clinical evidences of iodine deficiency, such as hairlessness and scanty wool were not common

Respiratory Ailments of Swine*

In all pulmonary diseases of swine, septicemic lesions may be encountered and at times they are extensive. Consequently, in making a diagnosis in cholera-susceptible herds, hog cholera cannot be eliminated from consideration.

Swine Influenza

This disease of swine was first reported in this country in 1918 by Dr. John S. Koen. It is a peracute infection caused by a combined onslaught of a virus and a bacterium. It is a disease of the fall and winter months. The mortality is low, almost nil in well-cared-for herds, but the economic loss, due to loss of weight and condition is heavy.

Symptoms.—Influenza appears suddenly; a large part of the herd developing symptoms at approximately the same time. It is attended by high temperatures and violent coughing. The animals lie in the nest, exhibit great weakness and lose weight and condition rapidly. There is complete inappetence, but thirst persists. Some sick animals will drink thin slop. Pregnant sows commonly abort, but, if the pigs are carried to term, they are often farrowed dead or are weak and soon perish.

Diagnosis.—The diagnosis of swine influenza is not difficult. The sudden onset, the large portion of the herd affected, the high temperature, inappetence, weakness and rapid gaunting are characteristic. When this is combined with unhygienic housing, high humidity or exposure that causes the animals to pile up and become heated, and are then exposed to severe chilling when they leave the nest, a picture is completed that is easily recognized.

A serious hazard in diagnosis and an ever present source of anxiety in herds susceptible to cholera is the chance of co-existence of influenza and hog cholera and, because the symptoms of the former are more conspicuous than those of the latter, it may be overlooked, and the whole herd lost as a result of the oversight.

The man shown in the center is Dr. John S. Koen, Storm Lake, Iowa, B.A.I., veterinarian on swine disease control for western Iowa. Doctor Koen was stricken November 10th with severe cerebral hemorrhage. His condition remained critical for a week. Improvement set in on the eighth day of his illness and has been continuous to this date. Although his condition is still very grave, recovery is expected, but since convalescence has much to repair, it is expected to be prolonged

Pneumonia is another complication of influenza, that may raise the mortality sharply in badly housed or poorly cared for swine.

Treatment.—Good care, warm, well bedded and dry quarters, free from drafts and dust, are indispensable requisites in the successful treatment of this disease. A straw loft is good equipment in an otherwise damp and drafty hog house. Cool to cold quarters are preferable to warmth attained by the sacrifice of ventilation and a frosty or dripping ceiling. Various expectorants and salines to replace the intra and extra-cellular salts, which are lost in dehydration, are beneficial if given in

*Notes from discussions at veterinary meetings.

the drinking water. Sick animals should not be disturbed more than is necessary. Repulsive medication should not be used or other medication employed that reduces the consumption of drinking water. Guaiacol preparations are quite generally used but are distasteful to some herds. A good practice is to first spray the bedding with such preparations, but not sufficiently to wet it. In this manner the animals get the odor of the medicine in their nostrils and object less to drinking the medicated water. Likewise, the inhalation of the drugs may be beneficial. Some farmers keep guaiacol on hand and use it occasionally to keep the pigs accustomed to it. Then when influenza develops, heavy dosage can be instituted immediately. With good care practically all affected animals recover, even without medication.

Infectious Pneumonia

Pneumonia in swine is encountered as a complication of a number of diseases. The term "yard diseases" is the euphemistic name applied to parasitic, enteric, and pulmonary diseases, the causative agents of which are harbored around old yards and buildings. Raffensperger and Ransom applied the less delicate, but more descriptive name "filth-borne diseases" to the same group. Dust, too, is an important factor in pulmonary affections. Dust irritates the lungs and also acts as a conveyor of infection into them.

Yard pneumonia is quite distinctive in that there is usually a greyish consolidation in the lungs and much fluid, foam and pus in the bronchioles. The anterior lobes are first affected and, as the disease progresses, it extends to the diaphragmatic lobes. Edema is sometimes noted in the areas not solidified. Overcrowding and faulty housing is often a deciding factor.

Enteritis and pneumonia are frequently encountered together. On some farms enteritis is seen one year and pneumonia the next.

Swine plague, caused by the *Pasteurella suisepticus,* is primarily a pulmonary disease and manifests itself by reddish consolidated areas, interspersed throughout the lungs with interstitial inflammation. Extensive septicemic lesions are noted.

Pneumonia caused by different types of streptococci are encountered, as is also a pulmonary edema, which may be complicated by pasteurella, diphtheroid and salmonella organisms. Due to the edema and the collection of fluid in the respiratory tree death is sudden in some of these cases; ofttimes occurring within 12 to 24 hours.

Symptoms.—Symptoms of pneumonia are pretty much the same, whatever the cause—labored breathing, thumping, nasal discharge, lachrymation and elevated temperature, which varies from 104 to 107° F. There may or may not be much coughing. Also there may be inappetence or diminished appetite.

At times this constitutes a very difficult situation to diagnose, and only by experience can all this confusion be untangled. The history of the herd and of the premises helps out, as does the elimination of other diseases.

Treatment.—The care and medication for swine pneumonia is the same in many respects as for swine influenza. In addition, porcine bacterins may be helpful. A clean water supply is essential to limit the degree of reinfection. To the same end, if only a few animals are showing symptoms, they should be segregated. The removal of dust is urgent. It may be kept down by the use of oil. In certain types of yard pneumonia, removal to clean ground is essential for satisfactory results from any treatment.

There are many long-used hog lots in the Corn Belt that harbor various infectious agents capable of setting up pulmonary infection when favored by climatic or environmental conditions. Young swine must be kept away from such yards. If pigs are turned into them they begin to sicken and die. If the herd is removed the losses stop. Return it to the old yard again and losses begin all over. This has been seen to occur as many as five times in a single season before the owner suspected the actual cause of his losses.

The ration should be carefully balanced. Alfalfa in some form is usually beneficial in pulmonary ailments, probably because of its vitamin A content.

The use of sulfathiazole has been reported to be helpful in pulmonary ailments generally, but it is somewhat expensive for a herd treatment. Logically sulfamerazine should be the sulfa drug of choice but clinical reports on its use are not available.

Medication that can be incorporated in the water or a thin slop (in most instances the appetite is impaired or in abeyance) should be used. Handling pigs suffering from pneumonia to medicate them individually is usually harmful because of the disturbance, annoyance, fright and struggling that it entails.

* * * *

Antoine Laurent Lavoisier (1743-1794) a French chemist is recognized as the father of the science of nutrition. He died by the guillotine during the Reign of Terror.

* * * *

Hog cholera superimposed on some more easily recognized infection has at times led to delay in treatment that spelled disaster for the herd.

Trichina Inspection in Germany

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General

THE trichina was first described in 1835, by Richard Owen who called the parasite *Trichina spiralis*. This name, however, was changed 60 years later by Railliet to *Trichinella spiralis*, because the name Trichina had been given to another animal species. Joseph Leidy, of Philadelphia, in 1846, received credit for first observing this parasite in pork. Some years later, Herbst demonstrated the transmission of the trichinella by feeding a badger the musculature of an infested dog.

Trichinosis results from eating meat that harbors this parasite. Man acquires the disease by eating raw or improperly cooked meat from infested swine, foxes, bears, or other animals; swine become infested by eating garbage containing scraps of infested raw pork or by eating the flesh of infested rats, and other animals. Rodents and carnivorous animals such as the dog acquire this parasite by eating the flesh of other animals already infested. The varying eating habits of people throughout the world make possible the transmission of this disease by the many animals listed above.

Incidence

Recent studies of trichinosis in man have revealed that, contrary to earlier beliefs, the mortality from this infestation is very low. In Germany, statistics available for the period of 1900 to 1927 indicate that 120 persons died on account of trichinosis.[1] Slaughterhouse laboratory records show that the infestation rate among 79 million pigs inspected in Germany in the period 1934 to 1937 was 0.44 per 100,000. On account of this low incidence in swine and due to the thorough trichina inspection that is required in Germany, the number of cases of human trichinosis during recent years have been infrequent; in fact, no cases of human trichinosis have been reported in Berlin since 1883.

Life Cycle

About 1860, Zenker described the life cycle of the parasite in the human being. The *Trichinella spiralis* is a small, hair-like roundworm. In its larval stage it is found in the fibers of voluntary skeleton muscles rolled up and encysted. If meat containing such encysted larvae is ingested, the protein of the muscle and cyst surrounding the parasite are digested in the stomach and the larvae are liberated. These pass on to the small intestines, grow to maturity, and on about the 7th day the adult females begin to deposit eggs which develop into larvae in the intestinal lymphatic recesses. From these areas the larvae migrate into the lymphatics of the intestines and thence into the blood stream. During the 7th to 27th day after the ingestion of infested meat, these immature forms may be found in the circulating blood. The larvae in the blood stream are distributed to all parts of the body, becoming localized chiefly in the voluntary skeleton muscles, the fibers of which they penetrate. From about the 21st day the formation of a thin-walled capsule around the embedded trichina has started, and hyalinzed capsules may be found in abundance between the 35th and 40th day. Calcification of the capsules begins about the 6th to 8th month after infestation. Investigations have shown that the parasites are not evenly distributed throughout the muscular system, the highest percentage being found in the two main muscles of the diaphragm, also in the rib part of the diaphragm as well as the muscles of the stomach, larynx, and tongue.

Technic of Examination

In areas of Germany it is customary to eat meat and meat products such as sausages in a raw or partially cooked state. Because of the possibility of acquiring trichinosis by the consumption of uncooked or unprocessed infested meat a very rigid inspection service is required in Germany to assure that the meat sold in the public markets is free from this parasite. The inspection of meat for trichina is regulated uniformly and is compulsory for the whole of Germany. The meat of all hogs, wild boars, dogs, bears, cats, foxes, muskrats, badgers, and other carnivorous animals which can possibly be hosts of the parasite are subject to an official inspection if such meat is intended for human consumption. So far as possible, the trichina inspection must be carried out directly after slaughter and in any case, prior to cutting up the carcass.

Inspection of the meat is performed with a microscope permitting a 30 to 40X magnification and also one of about 100X, which shows the objects distinctly and clearly. The trichinoscope is used in many of the large slaughterhouses of Germany. This apparatus, by means of a strong artificial light, projects a picture of the prepared slide onto a screen. All the specimens must be pressed between two thick squeezing glasses until normal print can be

[1] Statistics covering later periods were lost during the war.

*Lt. Col. Frank A. Todd is Chief, Veterinary Affairs, Public Health Branch, Internal Affairs and Communications Division, Office of Military Government for Germany (U.S.), Berlin, Germany.

read through them clearly. If the meat of the parts to be inspected is dry and old, the specimens must, before squeezing, be soaked for 10 to 20 minutes in an aqueous solution of caustic potash.

These specimens are required to be collected by the inspector himself and appropriately labeled for later identification. Specimens from whole carcasses must be the size of a hazelnut

A trichina inspector examining specimens from a carcass of a recently slaughtered pig. The German meat inspection law requires that all slaughtered pigs and other carnivorous animals which may be hosts of trichinella, which are intended for human consumption, must be inspected for the parasite by a qualified trichina inspector

and are to be taken from the crura of the diaphragm. If the crura is not present two specimens must be taken from the musculature of the rib or the sternum part of the diaphragm or from the abdominal muscles. Specimens submitted for trichinosis inspection, when not completely used during the inspection, are sold at a reduced price in especially licensed stores under police supervision, the proceeds from such sales being returned to the owner of the animal. From each such specimen the inspector must cut out seven oat grain-size pieces for examination. If an unauthorized cutting of a carcass has taken place before sampling, three specimens from every single piece must be obtained, preferably near bones or sinews.

Each prepared specimen is examined slowly under a microscope of 30 to 40X magnification. If the findings are doubtful, the examination is continued with an additional number of specimens and preparations and, if necessary, with the help of a stronger magnification until final clarification.

The inspection with a trichinoscope is also performed. If the examination with a trichinoscope should reveal suspected spots, the nature of which cannot be clearly determined, even with a stronger magnification of the trichinoscope, they must be re-examined under a microscope.

Not less than ten minutes are required by law for the examination of the specimens from each carcass when the inspection is done with a microscope, and not less than six minutes when a trichinoscope is used. With the use of the microscope, the inspector must not examine more than 36 carcasses per day and under exceptional conditions not more than 45, and with the trichinoscope, he must not examine more than 60 per day, and under exceptional conditions not more than 75 carcasses.

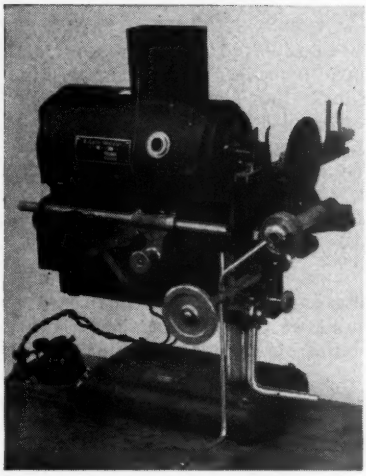
When the inspector detects in the specimens examined any trichinella or any doubtful formation, he must confiscate the carcass, or parts, for the time being and submit the samples and specimens in question for examination to the competent meat inspection veterinarian. In such a case specimens of the tongue and larynx muscles must be taken from the whole carcass and inspected.

Instruction and Training

Veterinary surgeons, lay meat inspectors who are qualified to perform trichinella inspection, and other persons who have passed the required examinations, may be appointed inspectors. Persons not eligible for such appointments are those gainfully occupied in administering animal treatment, persons performing castration of animals, persons employed in meat trade, livestock sales, rendering plant services, butchers and agents of animal insurance companies.

The training of trichinella inspectors is permitted only in public slaughterhouses licensed by the higher administrative authority. The courses of instruction must be given by an official veterinarian of a large public slaughter house. As a rule not more than four candidates are admitted to a course of instruction lasting 14 days at least. Each candidate must be between 21 and 50 years of age. Physical fitness and full possession of faculties is to be certified by an official physician or by a Public Health Office. Returning German war veterans are currently given the preference for these positions providing they can demonstrate physical ability to carry on such service. Recently, steps have been taken in the U. S. Zone to lower the age limit for the candidates. After the course of instruction each candidate appears before an examining board consisting of a State veterinary official, the director of

the course of instruction, and a veterinarian, usually a civil servant. The test consists of a theoretical and a practical part and determines whether the candidate has the necessary knowledge and ability required for reliable detection of trichinella and tapeworm



One of the several pre-war models of the trichinoscope. The prepared slide is placed in this machine and the specimen to be inspected is greatly magnified and projected on a screen. By using this apparatus the trichina inspector can complete examination of many more carcasses than by using just the microscope. A new, much simplified model is being constructed in the U. S. Zone

cysts. The candidate, having passed the examination, receives a certificate of efficiency. All practicing inspectors must report for re-examination every third year to the official veterinarian of the district in which they are employed. The result of this re-examination must be entered by the examining veterinarian on the inspector's certificate.

According to law, inspection districts *(Beschaubezirke)* are established wherever a slaughterhouse is not present, for the purpose of carrying out trichinosis inspections. Each inspection district usually includes a *Gemeinde* (village and surrounding rural area), or several neighboring *Gemeinden*. Each such district has at least one inspector and one deputy, whose names and addresses are made known to the public officially in the manner locally customary. The officials carry out all trichinosis examinations for farmers and local butchers who do not have access to large public slaughterhouses, and in the instances of emergency slaughter.

Technical supervision of the inspectors is the duty of the official veterinarian and of the veterinary section chief of the higher administrative authority.

Application for the inspection must be filed by the person who slaughters or intends to slaughter animals which are subject to trichinella inspection. Trichinella-free meat is stamped accordingly, together with the inspection district symbol.

A record of all inspections is maintained by the inspector, and is filed for future reference.

Disposal of Trichiniferous Meat

If the parasites are found the carcass may be sold only after it has been boiled or processed under veterinary police supervision. However, if the carcass shows heavy infestation it is declared unfit for consumption. The fat, however, is rendered and made available for sale.

Current Status

Since the termination of hostilities, instruction courses for inspectors have been conducted in all occupation zones in accordance with the existing German laws. Difficulties are being encountered due to a lack of an adequate number of carcasses being currently slaughtered, and of a sufficient number of demonstration specimens, a shortage of qualified instructors, as well as a shortage of equipment. Since many large slaughterhouses suffered war damage, repairs were necessary before satisfactory instruction courses could be conducted. Microscopes and trichinoscopes are again being produced in limited numbers and are being made available for this public service.

Summary

1. The incidence of this disease is low in Germany with very few cases being reported in man and animals.

2. A thorough microscopic or trichinoscopic examination is made, at the time of slaughter, of all animals which are subject to this infestation.

3. A description of the training qualifications for trichina inspectors as well as the technic of inspection is given.

References

1. Bugge, G., Biologie der Trichine, Arch, Tierheilkd. 68, 24 (1934) Hemmert-Halswick, A., Biologie der Trichine, *Arch. Tierheilkd* 68, 24-33 (1934).

Ostertag, v. R. Lehrbuch der Schlachttiere und Fleischbeschau 1932. Schonberg, F. und Zietschmann, O., Die Ausfuhrung der tierarztlichen Fleischuntersuchung 1944.

2. Communications between Dr. Leo Kiedrowski, Official Veterinarian, *Referat* for Veterinary Food Hygiene and Meat Inspection, Veterinary Department, *Landesgesundheitsamt*, Berlin, Germany, and the author.

3. Reports and communications from Military Government Veterinary Officers and Official German veterinarians.

Sulfonamide Blood Concentrations in Mink

By PETER H. LANGER, GEORGE C. POPPENSIEK, C. R. SCHROEDER, ROBERT L. BURKHART, and MARK WELSH*

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THE value of 1946 production on the 8,000 fur farms in the United States was approximately $125,000,000. Therefore, disease control in fur bearers is of great economic importance. Accurate statistics on the losses due to diseases are not available, due to the secretiveness of the fur farmer. However, the statistician of the National Board of Fur Farm Organizations estimates[1] that production might be 20 to 40% greater, if infectious disease could be controlled. In making this estimate, bacterial diseases and coccidiosis are of great importance, but prenatal losses, losses due to virus disease, such as distemper, and parasitic diseases, such as hookworm infestations, have been considered.

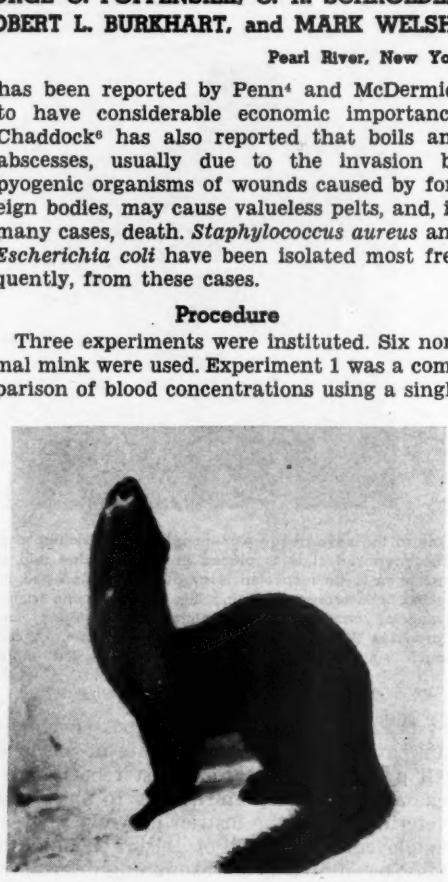
Until very recently, no information was available in the literature relating to sulfonamide therapy in bacterial infections in mink. However, the successful treatment of bacterial disease in domestic animals with various sulfonamides has been reported frequently. On the basis of present knowledge of the sulfonamides, it is generally believed that therapeutic results are correlated with blood concentrations, and that blood concentrations above 5mg per 100cc are effective. The original study[2] in this series reported variations in blood concentrations of seven sulfonamides in each of seven species of domestic animals. Therefore, it was considered likely that fur bearers might show considerable variation in the absorption, excretion, and acetylation of these sulfonamides. For this reason, a study of blood concentrations in both mink and foxes was undertaken. The present paper presents data on the results in mink. The study in foxes will appear in a subsequent paper.

Important Bacterial Diseases

The most generally recognized disease conditions in mink, for the treatment of which sulfonamides have been recommended, are pneumonia, paratyphoid infections, boils, and abscesses. Chaddock[3] stated that pneumonia, from which pneumococci, streptococci, staphylococci, and streptothrix have been isolated, is the most common cause of death in mink. Paratyphoid, the bacterial intestinal infection caused by the Salmonella group of organisms, has been reported by Penn[4] and McDermid[5] to have considerable economic importance. Chaddock[6] has also reported that boils and abscesses, usually due to the invasion by pyogenic organisms of wounds caused by foreign bodies, may cause valueless pelts, and, in many cases, death. *Staphylococcus aureus* and *Escherichia coli* have been isolated most frequently, from these cases.

Procedure

Three experiments were instituted. Six normal mink were used. Experiment 1 was a comparison of blood concentrations using a single fixed dose of each of seven sulfonamides. Experiments 2 and 3 were studies of sulfamethazine blood concentrations after parenteral and oral administration at a therapeutic level. Blood samples were taken at 4, 8, 12, and 24 hours after administration. Tail bleedings were made into vials containing dried potassium oxalate as an anticoagulant, and sulfonamide determinations were made according to the micro-modification[2] of the Bratton-Marshall method.[7]



The annual production of fur farms is $125 million

Experiment 1 was concerned with comparisons of blood concentrations in mink with a single fixed dose of drug, one-half grain per pound of body weight given orally. To permit correct drug comparisons, the same animals

*The authors are indebted to Mr. S. Senn and Mr. D. W. Gorton, of the Analytical Section, Lederle Laboratories Division, American Cyanamid Company, for sulfonamide analyses.

were used for each drug. All six animals received sulfamethazine, sulfadiazine, sulfamerazine, sulfathiazole, sulfapyridine, sulfaguanidine, and sulfanilamide in consecutive experiments. There was a rest period of not less than one week between each two trials. The drug was mixed into a small ball of fresh horse meat, and fed in the morning. On the evening before a given trial, only half the amount of regular ration was fed, to insure total consumption of the drug-meat mixture.

Experiment 2 was a study of the concentration in the blood of sulfamethazine injected subcutaneously in the animals used in Experiment 1, after a rest period of seven days. A therapeutic dosage was used 1½ grains per pound of body weight on the first day, and one grain per pound of body weight on the two subsequent days.

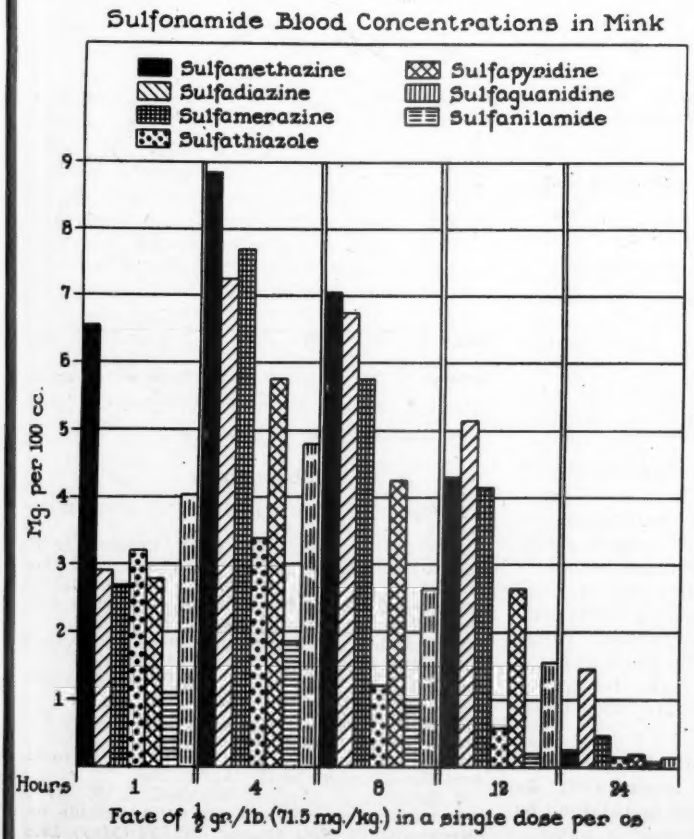
Experiment 3 was a study of the blood concentration of sulfamethazine administered orally in the drinking water. After a rest period of seven days, five of the six mink used in the other experiments were provided with a 1:500 solution (0.2%) of sodium sulfamethazine in the drinking water for a 24-hour period. The mink were permitted to drink, at will, of the medicated water.

Discussion

Figure 1 summarizes the average blood concentrations of free drug. It has been stated[2] that domestic animals do not acetylate sulfonamides to a marked degree, and that, for all practical purposes, total drug may be considered free drug. As in domestic animals, results indicate there is little evidence of acetylation in mink, so here too, total drug may be considered free drug.

This study was designed to show a comparison of the seven sulfonamides at the dosage rate used, and was not concerned with therapeutic blood levels. An immediate high blood level was obtained with sulfamethazine as compared with the others tested. High levels were established rapidly with sulfamethazine, sulfadiazine, and sulfamerazine, with the highest level recorded at four hours. Significant levels of these three sulfonamides persisted through 12 hours, in contrast with the others tested, with the exception of sulfapyridine. Although the sulfapyridine level is quite favorable in comparison with the pyrimidines, it should not be considered for therapeutic use due to its high toxicity. Sulfathiazole attained maximum blood levels of less than one-half those of the pyrimidine group and decreased very rapidly after four hours, indicating the necessity for higher and more frequent dosage. Sulfanilamide did not maintain adequate levels in comparison with the pyrimidines, and it, too, decreased quite rapidly after four hours. Sulfaguanidine may inhibit the growth of pathogens in the gastrointestinal tract, but blood concentrations inadequate to treat systemic disease are usually obtained when

Figure 1



the drug is given in subtoxic doses.

Figure 2 shows the blood concentrations attained by subcutaneous administration of therapeutic doses of sulfamethazine once daily. High blood concentrations were attained promptly and increased to a peak reading at four hours. Thereafter, there was a steady decrease, but, at 12 hours, the average blood level was still high. At 24 hours, however, a very low concentration was recorded. The peak levels on the second and third days were distinctly lower, but the curves were quite similar to those obtained on the first day. It has been found that, in carnivores, there is rapid elimination of the sulfonamides from the blood after 12 hours.

Figure 2

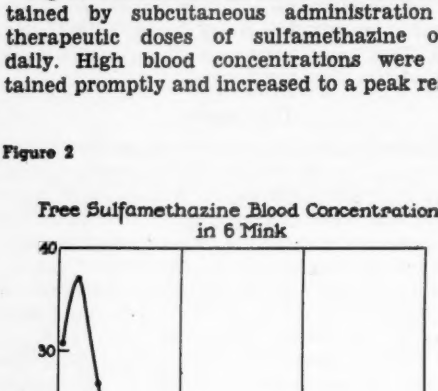

Free Sulfamethazine Blood Concentrations in 6 Mink
Mg. per 100 cc.
40
30
20
10
0
Hour 1 4 8 12 24 4 8 12 24 4 8 12 24
Day 1 2 3
Dosage:
1st day: 1½ gr./lb. body wt. subcutaneously.
2nd and 3rd day: 1 " / " " " "
SK-8

Figure 3 shows the blood concentrations attained by a 1:500 solution of sodium sulfamethazine, *ad lib.*, in the drinking water. It was observed that mink quite readily consumed the medicated water. Blood levels considered to be within the therapeutic range were recorded at one hour. The blood level increased through the eighth hour and gradually decreased. However, effective blood levels persisted through 24 hours.

Thus, it would appear that effective blood levels can be established immediately by parenteral administration, and maintained by oral administration in the drinking water.

Summary

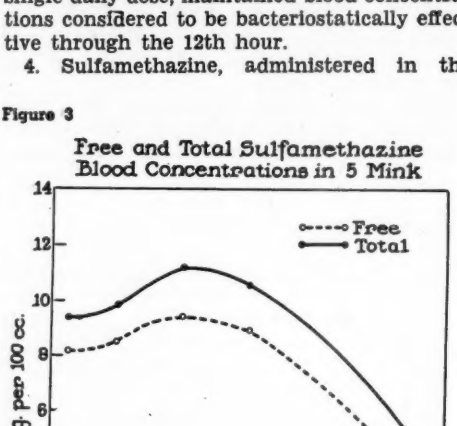
1. Blood concentrations are shown for sulfamethazine, sulfadiazine, sulfamerazine, sulfathiazole, sulfapyridine, sulfaguanidine, and sulfanilamide, in mink, after oral administration of a single fixed dose of one-half grain per pound of body weight. Sulfamethazine was also injected parenterally and orally in therapeutic doses. Blood determinations were made at stated intervals after administration.

2. Sulfamethazine, sulfadiazine, and sulfamerazine maintained the highest blood concentrations throughout the period of the test.

3. Sulfamethazine, given parenterally in a single daily dose, maintained blood concentrations considered to be bacteriostatically effective through the 12th hour.

4. Sulfamethazine, administered in the drinking water, maintained effective blood concentrations for 24 hours.

Figure 3



Dosage: 1:500 solution in drinking water ad lib.

Bibliography

1. Sheldon, Willard B. Personal communication.

2. Welsh, M., Schroeder, C. R., Vroman, D. F., Reddin, L., Burkhart, R., and Langer, P. The fate of ½ gr./lb. body weight of seven sulfonamides in seven animal species. Proc. 50th Ann. Meeting U. S. Livestock Assn., 1946, p. 213.

3. Chaddock, T. T. Pneumonia as it occurs in mink. *Am. Fur Breeder*, 18:14 (May) 1946.

4. Penn, K. E. Salmonella infections in mink. *Am. Fur Breeder*, 19:38 (Jan.) 1947.

5. McDermid, A. M. Food poisoning. *Am. Fur Breeder*, 19:18 (Oct.) 1946.

6. Chaddock, T. T. Control of boils in mink. *Am. Fur Breeder*, 18:18 (Apr.) 1946.

7. Bratton, A. C., and Marshall, E. K., Jr. A new coupling component for sulfanilamide determination. *J. Biol. Chem.*, 128:537 (May) 1939.

Formaldehyde a Blood Coagulant in Vivo

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FOR a period of years a search has been in progress, in my practice, for a good chemical or biological substance to coagulate blood *in vivo* or to increase the thrombin content of blood depleted by certain disease processes.

It has been my experience, that in virus encephalitis of the dog, the blood suffers severely from the lack of thrombin and, as in some other virus diseases, the blood leaks through the blood vessel walls, producing edema and erythemia in various tissues of the body, principally subcutaneous, and in virus encephalitis subdurally and into the brain itself. This edema in the spinal canal and cranium produces various types of nervous excitement convulsions, and, if the extravasation is severe, lethargic encephalitis, paralysis and coma. Many so called "dumb rabies" cases are of this category. The edema of the brain resulting from this hemolyzed blood oozing through the vessel walls in the encephalon, naturally produces varying symptoms depending upon the centers of the brain which were subjected to pressure. Ice packs to the head give temporary relief in these cases, but something is needed to remove the cause, *i.e.*, to prevent further hemorrhage. Something is needed also to afford relief for a longer period than an icebag is effective.

For a number of years various hemostatic agents were used with satisfaction. However, their cost was such as to materially restrict their use. Vitamin K was the least expensive and one of the most effective. Last April experimentation was begun with formaldehyde as a less expensive substitute.

Having used a 1% formaldehyde solution to preserve blood serum, in the early experimentation with virus encephalitis in dogs, I had noted that, when this blood was defibrinated and the fibrin removed, adding 1% formaldehyde solution formed a solid mass, so other preservatives had to be used. I tried to find a means to recover and liquefy this clotted serum but was told that I used one of the most positive chemicals for blood clotting and my efforts would be wasted in trying to recover the serum. This left a thought in my mind but it remained dormant until activated by a verbal report of a paper on bloody mastitis, in which it was reported that the hemorrhage into the udder was stopped immediately by intravenous injection of 100cc of 0.5% formaldehyde solution.* Having used formaldehyde *per os* for hemorrhagic mastitis, it "clicked" in my mind, and an investigation was begun of the use of formaldehyde in canine virus encephalitis to produce thrombin in the blood.

Various percentages of formaldehyde solution were tried and various doses of the various percentages were used. All thickened or solidified hemolyzed blood. However, the 1% solution was accepted as the most suitable to use and most practicable. This is not a 1% solution of formaldehyde but a 1% solution of formalin and therefore actually 0.4% of formaldehyde by volume, but it is commonly referred to as 1% formaldehyde solution and when that term is used it should be kept in mind that 1% of formalin, itself a 40% solution of formaldehyde by volume or 37.5% by weight is meant.

After a number of trials the dosage was established as 2cc for small puppies to 15cc for very large dogs, and again the degree of hemolysis played a part. However, dogs of medium size were given 5cc and larger dogs 10cc. Occasionally very large dogs were given up to 15cc. A majority of the cases were given 5cc of the 1% solution. Other parenteral medication usually was administered at the same time and this solution was mixed in the syringe with the sedative, or the canine encephalitis serum if no sedative was used. When a sedative was used as outlined in the various cases mentioned formaldehyde solution was drawn into the syringe first then the sedative was drawn into the same syringe. The sedative of choice in my practice has been a 20% solution of magnesium sulfate. An increased benefit has been noted from the use of these combined solutions, resulting in less nausea, quicker sedation, and, on regain consciousness, less hysteria. It is preferable to use this 1% formalin and 20% magnesium sulfate solution intravenously as there is a momentary "bite" when it is used intraperitoneally, and it takes longer for the sedation to occur.

Thus 5cc of 1% formalin solution added to a 20% solution of magnesium sulfate is given at a rate of from ¾cc to 1cc per pound of body weight up to a total of 30cc for larger dogs. The intravenous route gives better control, plus more rapid action, and in cases of convulsion, speed of action is a factor. However, it may be very difficult to give an intravenous solution to a dog in a convulsion. It then becomes necessary to inject it intraperitoneally. Another method which has proved of value in "wild" cases is to give one-half the

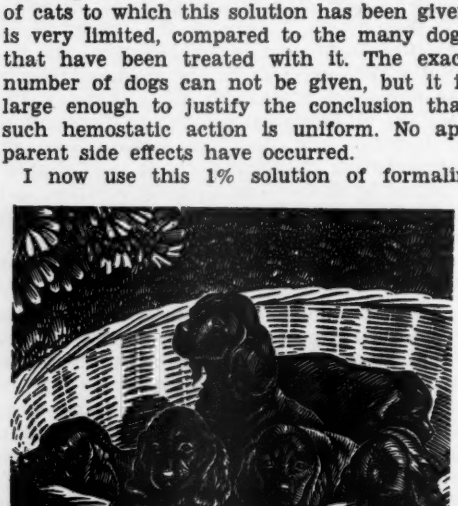
*This report by Dr. J. E. Fisher was published later. *Vet. Med.*, p. 315 (August), 1947.

dose intraperitoneally and the remainder intravenously when the animal has quieted somewhat.

When any surgery is performed I find the addition of the 1% formaldehyde solution to the anesthetic is valuable to assist in the control of hemorrhage.

A 0.5% solution has been used in the cat and kitten in a manner similar to its use in the dog to control convulsions. The number of cats to which this solution has been given is very limited, compared to the many dogs that have been treated with it. The exact number of dogs can not be given, but it is large enough to justify the conclusion that such hemostatic action is uniform. No apparent side effects have occurred.

I now use this 1% solution of formalin



Slow clotting blood is characteristic of virus encephalitis in puppies

routinely in all cases of canine virus encephalitis, all anesthesia, and in anemia, as there is a definite lack of thrombin in cases of anemia. It is convenient to use when treating a case with other parenteral solutions and can be given either intravenously or intraperitoneally. The bite, which occurs when it is given intraperitoneally, is of little consequence as it is of short duration and the speed of the improvement, offsets this slight discomfort. Occasionally some fussy client may ask an explanation of the dog's reaction, but before one can start to explain the animal is quieted and the need of such explanation has passed. If the fussy client is insistent it is a well known fact that a period of excitement normally precedes anesthesia and this is a logical explanation if one be needed.

In the majority of cases of virus encephalitis, the dogs are already so highly nervous and refractory that the reaction to intraperitoneal injection of the formaldehyde solution is not noticed. The calm which follows its use, usually offsets any show of displeasure on the part of the owner.

The most striking experiments with the formaldehyde solution was in cases of canine virus encephalitis. In this disease the blood is definitely hemolyzed, oozing through capillaries, causing edema of the brain and spinal cord and erythemia of the skin and various organs. When these animals were bled, the blood recovered is very slow to clot and is easily shaken up and separated by beads, and remains separated. The behavior of blood of dogs used for the production of hyperimmune serum, is just the opposite. The shaking of such blood in the bead bottle has to be done immediately, since it clots as it is drawn into the bottle and if allowed to stand a moment it forms a solid mass which is difficult to break up and has a tendency to clot again. Thus the virus infected and the virus hyperimmune blood, contrast strongly in clotting action. The virus animal therefore was an ideal one for experimentation.

Dogs suffering from virus encephalitis were anesthetized with magnesium sulfate 20% solution for these tests. The following cases are typical of the reactions observed:

Case No. 1.—This, a 30-pound dog, was injected with 10cc of a 10% formaldehyde solution, intraperitoneally. After a short waiting period the chest having been previously prepared, the bleeding equipment was properly placed. An intracardiac puncture was made and the blood caught in a sterile clear glass, bead bottle by means of low vacuum. By the time beads were covered, the blood had clotted in the bleeding needles and tubes. A four-inch, 13-gauge needle was used for the heart stab and a two-inch, 13-gauge needle was used to penetrate the rubber stopper of the bottle. A second bleeding tube was used. No blood passed through the entire length of the tube; the clot occurring in the first three-quarters of it. A third bleeding tube was used and the clot occurred in the four-inch needle. This animal was then given an overdose of anesthesia and a necropsy held. It presented a great contrast to untreated cases; the blood being clotted throughout the carcass. Obviously this was more clotting action than the condition required.

Case No. 2.—A 5% solution was used in this case. The results were in keeping with Case

No. 1 but the reaction was somewhat slower. This animal was given a therapeutic dose of hyperimmune serum and recovered more rapidly than other cases, which were given other valuable hemostatic agents. Apparently a weaker solution would be effective.

Case No. 3.—In this case a 1% formaldehyde solution was injected. The blood responded much the same as that of hyperimmunized animals. The dog was sacrificed and the necropsy revealed similar gross blood changes.

Case No. 4.—This dog was treated the same as Case No. 3, but was given also a therapeutic dose of serum. It recovered in about the same manner as No. 2.

As stated many cases were treated successfully with the 1% formalin solution in the months that followed, and it has been established as good medication.

Recently I have prepared a quantity of the 20% magnesium sulfate solution with a 1% formalin solution, to use after standing for varying periods. A report on this must await some future date as no conclusion has been reached as to how stable it may be or whether toxicity may develop on standing. Heretofore I have mixed the two solutions at time of using them.

In preparing formaldehyde solution, the water is sterilized and cooled before adding the formaldehyde, since formaldehyde being a gas in solution if mixed with warm or hot water may vaporize, and much of it be lost.

No microscopic examinations have been made to determine the kidney damage if any or if there is damage done to any other organ. In fact few of my tests were made with normal dogs, for the reasons given, and it would have been difficult to assess to the proper source any tissue damage found upon microscopic study.

The initial dose has proved adequate. However, if maintenance of a thrombin level is needed, I supplement the injection with oral medication by vitamin K, using 3mg to 20mg per day and adding bile salts for better results. When vitamin K was used alone it definitely was necessary to use it orally to supplement the injection or a repetition of injections was needed.

I did not make a comparison of the effect of vitamin K and the formaldehyde solution on virus cases, but having used "K injectable" in several thousand cases, I could arrive at a conclusion satisfactory to myself. It is, *the formaldehyde has a more powerful action of longer duration, and a greater quieting effect than any other agent I have used.* I do not mean to infer that the formaldehyde is a sedative. Its quieting action is indirect. By increasing the coagulability of the blood it stops the leakage into the tissues of the central nervous system. The pressure resulting from this leakage is the cause of the excitement, the convulsions, the coma and the paralysis, depending upon the amount of pressure. When the cause is removed, if the damage to the nervous tissue is not already too great for repair, recovery soon sets in.

I am not unmindful of the claims of some, that the vascular leakage in virus encephalitis is due to virus damage to the intima. However, the condition of blood withdrawn from cases of this disease the action of formaldehyde solution on this blood *in vitro* and the effect of this agent on this disease, to my mind justify the conclusion that the condition of the blood is responsible for the leakage, or is an essential factor in bringing about the leakage. But even though this theory were abandoned the use of formaldehyde empirically in virus encephalitis, and various other viral and bacterial diseases, in which there is hemorrhage into the tissues, would be justified until a better hemostatic agent is produced.

* * * *

Man's Best Friend

Some two hundred years ago Voltaire said, "Doctors are men who cram drugs, of which they know little, into bodies, of which they know less, for diseases of which they know nothing at all." Whatever may have been the truth of this statement at that time, and it was probably an exaggeration even in Voltaire's time, the intervening years have brought marked changes in medicine. Today, no one will deny the amazing progress in medical science, not only in the knowledge of drugs, but also in the diagnosis of diseases and their better treatment.

Directly or indirectly all of these advances in medicine have been made possible by laboratory studies of living tissues. Because of the close unity of physiological functions between man and certain animals, members of the animal kingdom have been used to check the dosage, the toxicity, and the effectiveness as well as the undesirable action of drugs. Animals have been used for the study and perfection of surgical technics and in the solving of many research problems.

The scientific knowledge obtained from animal experimentations has greatly benefited man, so that at all times the science of medicine is applied to him—not tested on him. Many of the triumphs of modern medicine may be attributed to dog experimentations. The dog, "man's best friend," perhaps more than any other animal has done much to push forward the borders of medical knowledge.—*Pharmacal Advance*, October, 1947.

Veterinary Practice—XII

By E. T. BAKER
Moscow, Idaho

Everyday Life of a Practitioner

As we look back over our 34 years of active, general practice, what are some of the reactions we have to our profession? Would we care to re-live these busy years? Could we have done better in some other branch of veterinary service?

As we have mentioned time after time, luck plays a prominent part in individual destiny. Even beginnings in practice are largely affected by good or poor fortune.

For these and many other reasons we entertain no exalted opinion about our modest achievements or average success. We merely represent an epoch in a passing century. Our autobiography bears this out for we entered practice at the ending of one era and the beginning of a new one. After each of its wars, our country enters into a new and changing period of exciting adventure. This latest war will prove no exception. When we look at ourselves in this light we will not feel so egotistical or so important.

No Routine in Practice

A practitioner, first and foremost, is not bothered by deadly routine. Each day is a new adventure. It is not like the government meat inspector who looks at the board in the early morning and sees:

"10,247 hogs today."

He knows there will be 20,594 submaxillaries to palpate, and half that many viscera to gaze upon. His day's work is cut for him, and he knows it.

The practitioner, however, has a little business to conduct. His is a small business Congress has not heard about. He sells his services to his clients; then delivers the goods. His success or failure largely depends on the final results.

When he is not out on calls, he has plenty to do around his medicine room, cleaning instruments and washing bottles, or compounding new mixtures. If he has any side lines, like state work, city meat inspection, laboratory work, or special testing for the government, these take up a lot of spare time. He has no regular hours, but must work when it comes, whether day or night, weekday or Sunday, rain or shine.

Depending on his location, he has his busy seasons and those not so full of calls. He is his own boss, and is likely to develop into a "rugged individualist."

He has his economic hazards just as the salaried man, whose pay can stop almost any time. A sudden hailstorm or a bad freeze may curtail both work and collections. A drop in prices for farm products is immediately reflected in his practice and still more in his income.

He must fight bad roads in both summer and winter, unless he is located where he does not have to get off the pavement. He has competition, not only from members of his own profession, but from a host of parasites, ranging from the medicine peddler to the "handy man."

He has easy calls and difficult cases to handle. He must not be afraid to get "messed up" at times. The surest way to get a call to "clean" a cow, is to get all dressed up, ready for a party or some other form of recreation.

When he stops working to take a vacation, his income ceases, but most of his expenses continue. He pays his own expenses to veterinary and other meetings.

And Finally—

To come back to my own experience, I think the advantages of private practice have outweighed the disadvantages. It has given me a feeling of independence, and courage to face life. It has taught me that if I keep my health, and render a satisfactory service to my clients, I will always have a "good living."

We have not accumulated wealth, but we are in the same class as a prosperous farmer who is out of debt, and who has a little money in victory bonds or in the bank. We have reared a small family in the traditional American way. We have been fortunate to be located in a fine college town, with friendly people, and plenty of opportunities for pleasant recreation. We haven't needed nor sought more; not envied those who had it. There are thousands of veterinary practitioners all over our country in the same category. We go along our way, doing the best we can, succeeding here and failing there, but always "pitching."

This, then, is the saga of one country practitioner who has taken time out to write down his impressions of our profession. Perhaps, it may lead others to do the same for I sincerely believe veterinarians are much interested in the "doings" of fellow practitioners—judging from the camaraderie of the great number of letters written to me while these jottings of mine have been published.

(The End)

Clinical Reports

Hydrometra in a Two-Year-Old Cat

November 2, 1947, a female cat, two years of age was admitted to the hospital for an ovario-hysterectomy. The history showed that the cat was apparently normal in every respect; had a good appetite and was in good condition. She had had two litters of kittens during her life.

The animal was starved for 24 hours and then given one grain of pentobarbital sodium *per os*. The operative area was prepared in the usual manner—shaved, scrubbed with soap and water, and painted with tincture of metaphen. Ether was then administered until the proper degree of anesthesia was reached.

An incision, approximately one-half inch in length, was made on the midline about midway between the umbilicus and the brim of the pelvis. The left horn of the uterus was picked up with a Snook's hook and the left ovary and horn was brought to the surface. The ovarian vessels were ligated and then the ovary was separated from the vessels by means of a small angiotribe. A hemostat was placed on the uterine horn to prevent bleeding.

The left horn was then drawn taut in an attempt to get at the bifurcation so that the right horn and ovary could be located. As the search progressed, the bladder kept protruding into the operative area until it was decided to enlarge the incision posteriorly. When this was done it became apparent that the structure mistaken for the bladder was, in reality, the right horn of the uterus greatly enlarged and turgid with fluid. It measured approximately seven inches in length and two inches in diameter, with the blood vessels engorged and greatly distended. The vessels supplying the ovary were then ligated and the ovary removed. Both horns were then followed up to the bifurcation and ligations were made in the uterus and the complete structures (ovaries, horns and uterus) were removed *en masse*. The accompanying photograph shows the complete structures. It was taken approximately 30 minutes following the operation.

The affected horn was found to contain 94cc of a turbid fluid with a specific gravity of 1.012. It contained no blood of pus cells.

The animal was given 50cc of dextrose (5%) in saline solution and this was repeated every six hours. Along with the initial dose of saline, 1cc of liver-vitamin B complex was given intramuscularly. At no time, following the operation, did the visible mucous membranes show paleness and the heart and respiratory action remained fairly normal although the corneal reflex was absent on several occasions.

Saline and dextrose injections were given from November 3rd until November 6th when

A—left ovary, B—bifurcation of uterus, C—right ovary

the animal died at 3:50 p.m. (seventy-two hours after the operation).

A post-mortem examination revealed all the organs to be in a normal condition with the exception of the heart which showed petechial hemorrhages over the surface, and a slight amount of blood-stained fluid in the pericardial sac. The liver was enlarged and showed a mottled effect, but on section appeared normal.

Analyzing this case which could be diagnosed as a hydrometra, I find it almost impossible to believe that the animal could have been in this condition for any considerable period without showing some symptoms. As far as the outcome of the case goes, I believe that the nervous shock sustained by the animal from the removal of so much tissue and fluid probably overtaxed the heart and failure resulted. I shall appreciate any suggestions or comments from practitioners concerning this case or the diagnosis.

EUGENE I. BROOKS

Hatboro, Penna.

A Rare Case of Carcinoma in the Dog

A spayed, flat-coated, liver-colored Retriever, about 12 years of age was brought to the hospital with a history of a chronic cough.

Auscultation over the cardiac region revealed valvular bruits. In an X-ray photograph of the chest, the lungs appeared mottled, suggestive of neoplasia.

Treatment was started by giving 1½ minims of f.e. digitalis and two minims f.e. belladonna three times a day for one week, discontinuing for a week, and continuing again for another week. After about a month, the cough ceased and the treatment was stopped.

[1] Feldman, W. H., Neoplasms of Domestic Animals, pp. 302-309. W. B. Saunders Co., 1932.

Eighteen months later, this bitch was returned to the hospital after retrieving ducks in ice water for two days. The next day she was stiff in the body and legs and unable to move about unaided. She was placed on acetyl salicylic acid for two days in the hope of relieving her discomfort. As no improvement resulted, euthanasia was advised and an autopsy performed.

The heart was slightly enlarged and somewhat thin-walled, but there was no evidence of any valvular insufficiency. Raised, light-colored circumscribed areas were observable on the surface of the pancreas, spleen and lungs. The lesions in the pancreas measured about 0.5 to 1.0 inch in diameter; those in the spleen and lungs about 0.25 of an inch in diameter. There was little functional tissue remaining in the pancreas and only one-half, or less, of lung capacity was left. Grossly the spleen was less severely affected. Chronic diffuse interstitial nephritis was present. Adhesions of the bladder to the large intestine and of the latter to the parietal peritoneum were also noted. The liver showed slight fatty changes. The soft tissue on the ventral aspect of the thorax were slightly edematous.

Stained tissue sections were made of the pancreas, spleen, lungs, liver, and kidney. The liver and kidney sections merely confirmed the observations on the gross specimens.

The pancreas, however, had little of its normal architecture remaining. There were many cells in the field containing mitotic figures and indicating malignancy. These cells which were undergoing mitosis, along with other cells of similar nature were generally cuboidal; and in their arrangement bore some resemblance to the form of the normal pancreatic acini. Many of the cells showed some form of retrograde changes which are characteristic of neoplasms. Some showed cloudy swelling, some had vacuoles indicating fatty metamorphosis, others had undergone coagulation necrosis. The microscopic findings in the spleen and lungs were similar except that the neoplastic cells did not resemble the acini in their arrangement as closely as those in the pancreas.

The interstitial nephritis can hardly be considered significant. Nephritis is by no means uncommon in a dog of this age, and the slight fatty changes in the liver were not necessarily related to the pathological lesions elsewhere. The enlargement of the heart, however, was probably caused by obstruction to the circulation. The failing circulation combined with the decumbency might account for the ventral edema of the thorax. On further questioning the owner, it was learned that the bitch was spayed during advanced gestation and the operation was followed by severe complications from which the peritoneal adhesions could have resulted.

Since the malignant cells resembeld pancreatic acini in appearance, the neoplastic tissue can probably be classified as an adenocarcinoma. The pancreas was probably the primary seat of the cancer; metastasis having occurred to the lungs and spleen.

Feldman[1] mentions that neoplasms of the lungs and especially of the pancreas are rare in dogs. He makes no reference to having encountered either a primary or secondary neoplasm of the spleen. Thus it may be assumed that a carcinoma of the spleen in a dog is of extremely rare occurrence.

W. A. FREY

Salina, Kan.

A Living, Two-Headed Calf

October 1, 1947, a grade cow, belonging to Steve Lute, Blackwell, Oklahoma, gave birth, unassisted, to a heifer calf having two distinct heads.

The dam is a cross bred Jersey-Hereford and the sire is a registered Hereford. At the time of this writing, December 1, 1947, the calf is well and gaining weight daily.

The head is divided equally, one side is exactly like the other, with the exception of a split tongue and mandible on the left head. The other tongue and mandible are normal. This calf has two good eyes, one on the outside of each head, but the two center eyes are blind due to a lack of tear glands. The center eyes are nearly in the mid line of her body and the lateral canthus of one unites with the lateral canthus of the other. Feeding is accomplished with a bottle and nipple. Feeding

is through the right mouth only but the left tongue and jaw moves simultaneously with the right during feeding. When she was 10 days old she developed a parotiditis of the left gland which responded well to penicillin.

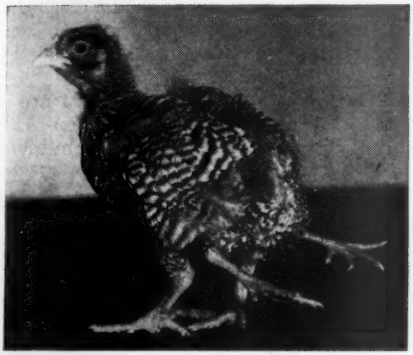
The daily feedings include milk from the dam, calf meal and concentrated vitamins and minerals.

N. L. ASTLE

Blackwell, Okla.

Two Too Many Legs

An Xray of the chicken showed two complete vertebral columns and two intestinal



tracts. There are two vents also. The photo above was taken when the chick was six weeks old. At last report the chicken was 14 weeks old and doing well.

R. M. DADD

Paintsville, Ky.

Surgical Correction of a Perineal Hernia

The subject was a brown and black, nine-year-old, male Pekingese weighing about 15 pounds, which had a history of a recurrent perineal hernia over a period of two years. The bladder evidently prolapsed into the weakened region which was on the right side of the anus. The chief symptom noted by the owner, besides the swelling (which was soft and fluctuating), was a retention of urine and an evidence of great pain. The condition had been corrected several times in the two-year period by passing a catheter through the urethra or inserting a trocar into the bladder to permit escape of the urine and then forcing the bladder back into the abdominal cavity by manipulation on the outside aided by one finger in the rectum.

On the morning that the dog was last brought in for treatment, the perineal region was greatly swollen and the firm, fluctuating contents indicated that the bladder had again prolapsed and was turgid with urine. The patient evidenced extreme pain, tenseness and posterior paresis. The owner reported that the region had started to swell the previous afternoon. The mucous membranes were quite muddy, though there was little odor of urine in the breath. The pulse was 120, respiration 60 per minute and temperature 100.4° F.

By removing approximately 400cc of turbid urine the patient was greatly relieved.

It was decided to operate the same afternoon in spite of the fact that the patient was a poor surgical risk and the operation a notoriously unsuccessful one. The owner was given a guarded prognosis.

A liberal area over and around the hernia was shaved; the area was scrubbed with alcohol sublimate for five minutes and then painted with tincture of iodine.

The anesthetic employed was 1.5cc of nembutal intravenously and local infiltration of the operative area with 1% procaine solution.

The animal was placed in lateral recumbency on his left side with the right hind leg drawn well forward. A catheter was passed up the urethra and the urine again removed by pressing on the distended bladder. A 1.5-inch incision was made through the skin over the hernia and the subcutaneous tissue broken down manually. The hernial ring was very large and contained the bladder plus a loop of colon. These were easily replaced in the abdominal cavity for no adhesions had formed at the hernial ring. Then with an assistant retaining the bladder in position by digital pressure through the rectum, the hernial ring was sutured using 0-gauge, 20-day, chromic gut. The sutures used were continuous, tied every other stitch to make a modified mattress suture and these redoubled back, thus turning the first row of sutures into the ring as in the Czerny-Lembert suture. Strong fascia was found to retain the sutures laterally, but medially there was little support except the rectal wall itself so this was partly used.

There was an excess of skin following the replacement of the hernia so a good sized portion was removed, and the skin incision closed with interrupted sutures. Sulfanilamide powder was dusted on the wound but no textile dressing was applied.

The patient was also suffering from prostatitis which may have been a predisposing factor. The prostate was massaged and three milligrams of stilbestrol injected subcutaneously. It was thought that the age and general condition of the patient was such that castration at that time was contraindicated.

The skin sutures were removed in five days. The wound appeared entirely healed and

though there was a slight pouching of the skin, the hernia had not reappeared two months after the operation. The patient was apparently in good health with lots of pep and appetite; micturition and defecation were entirely normal. It was recommended that the owner keep the patient's bowels loose with mineral oil to forestall constipation and a return of the hernia.

C. B. THAYER

Aurora, Ill.

Treatment of Peritonitis in a Dog with Streptomycin

On 13 October 1947, a mixed terrier, eight months of age, weight 19 pounds, in apparently good general physical condition was operated on for foreign body obstruction of the small intestine. Nembutal anesthesia was used, preceded by 1cc intramuscular injection of nikethamide and 5cc solu-B.

The foreign body, a hard rubber ball, was removed by intestinal re-section, as the bowel did not appear viable, followed by subsequent anastomosis. In spite of all precautions, a small amount of intestinal material was spilled into the peritoneal cavity. This was sponged out as much as possible, and 15cc sterile sulfadiazine solution instilled in the abdominal cavity. The completed operation was followed by supportive treatment, which consisted of the intravenous infusion of 250cc purified gelatin in isotonic solution of sodium chloride, plus additional amounts of solu-B and nikethamide.

14 and 15 October 1947.—The dog apparently doing all right, but was quite lethargic.

16 October 1947.—The dog was listless, showing some dyspnea, temperature 103.8° F. Administered 5cc solu-B combined with 1cc adrenal cortex extract and 250cc dextrose 5% in lactate-Ringer's solution subcutaneously, plus 100,000 units penicillin G crystalline, in oil and wax, intramuscularly.

17 October 1947.—The temperature was 104.6° F.; the treatment given was the same as the preceding day.

18 October 1947.—Temperature 105.2° F., some discharge from incision (typical peritoneal exudate). Increased the dextrose in lactate-Ringer's solution to 350cc, plus solu-B, adrenal cortex extract and penicillin in oil and wax. Diagnosis: peritonitis.

19 October 1947.—The temperature was 105.6° F., a profuse discharge of peritoneal fluid from the incision and some secondary lung congestion were in evidence. From a clinical standpoint, about the only untoward symptom not observed was vomiting. Remembering that some of the intestinal contents had spilled into the abdominal cavity and realizing that we might be dealing with peritonitis caused by *B. coli*, we started streptomycin therapy (so far penicillin treatments had not proved in the slightest degree beneficial). Streptomycin was given intramuscularly, at a dosage schedule of 200mg every three to four hours, day and night. Supportive therapy included 250cc purified gelatin in isotonic solution of sodium chloride by intravenous drip, also 5cc solu-B and 1cc lipoadrenal cortex.

20 October 1947.—The temperature was 103.2° F. and the animal seemed brighter. Treatment was the same as the day before.

21 October 1947.—The temperature 101.8° F. The dog drank some eggnog. The discharge of peritoneal fluid from the incision was scanty. The injections of streptomycin, 100mg every six hours, were continued.

22 October 1947.—The temperature was 101.5° F. The appetite was fairly good for eggnog and cottage cheese. Streptomycin given as before.

Streptomycin was continued for two more days. Recovery was rapid and uneventful.

Conclusions.—We undoubtedly were dealing with peritonitis caused by *B. coli*. Penicillin in oil and wax was ineffective; but when streptomycin treatment was started, improvement was prompt, and complete recovery resulted. We feel the use of rational supportive therapy was of definite value in treating this animal. Inasmuch as the majority of cases of peritonitis are caused by gram-negative organisms, we feel that streptomycin is the antibiotic of choice rather than penicillin in treating this infection in dogs. Our dosage of streptomycin for this 19-pound dog, varied from 100 to 200mg injected intramuscularly every three to six hours.

J. LAVERE DAVIDSON

Kalamazoo, Michigan

Cesarean Section in a Ewe

It is possible for a case to survive even the most unfavorable prognosis. The report of such an instance adds little of value to veterinary literature, since the survival should not be taken as evidence that the original prognosis was ill-advised. At best it encourages us to try all means at our disposal to save an animal, provided it is the wish of the owner to spend his money on an admittedly lost cause.

History.—A yearling Hampshire ewe, recently registered by a young 4H Club member, went down on the fifth day before parturition and was unable to rise. No veterinarian was called, however, until five days later, when the ewe had been in labor at least eight hours

She was dull, her breathing difficult, and her right flank was distended and solid on palpation. Vaginal examination revealed a dilated cervix, through which protruded an ear, and beyond which was a head, much too large to traverse the pelvic inlet. Consequently, a prognosis unfavorable as to both the ewe and her lamb was made, but cesarean section was performed.

Operation.—The ewe was placed on her left side on a table. It seemed hardly necessary to confine the exceedingly weak creature.

Her right flank was shaved (fortunately she had been shorn a week previously), washed with soap and water, dried, scrubbed with 10% alcoholic roccal, and covered with an alcoholic roccal-cotton pack.

Because of her depressed condition, no general anesthetic was given. Instead, the skin and musculature in a dorseo-ventral line about midway between the last rib and the tuber coxae were infiltrated with about 25cc of 2% procaine hydrochloride.

The skin incision was made with one scalpel, a sterile shroud placed over the area, and the flank muscles and the peritoneum incised with a second, sterile scalpel. The incision through all layers was about eight inches long.

Up to this point the technic was orderly and fairly sterile, but exploration in the abdominal cavity revealed a uterus greatly distended, so that the extremities of the lamb were indistinguishable through its wall. Therefore, it was simply drawn as close to the opening of the incision as possible and incised at the most available portion of its surface.

At once a dry fetus protruded partly through the incision, which proved to be inadequate and was lengthened about two inches. The assistant then succeeded in locating the hind legs and withdrawing a dead, edematous lamb from the uterus.

Because the ewe was in pain at this point, she was given ether without any precautions such as lowering the hind parts or hanging the head over the edge of the table in case of vomiting. The case was regarded as absolutely hopeless and the owner was so informed, but he insisted that all possible be done to save the ewe.

No part of the fetal membranes were removed. The uterus, the incision, in fact, the whole contaminated operative area was washed with sterile saline. The uterine incision, plus a short tear made at right angles to it during the extraction of the fetus were closed with a double row of continuous sutures, made with No. 1 catgut. The uterus was again washed with the warm sterile saline and replaced in the abdominal cavity. One of the few favorable signs in the whole case was that the uterus contracted rapidly in a normal manner.

Just before the final peritoneal sutures were made, 250cc warm, 25% dextrose was poured into the abdominal cavity. The muscles were approximated with No. 1 catgut. They were again bathed in warm, sterile saline. Interrupted mattress sutures of umbilical tape were used to close the skin incision, at the most dependent part of which was left a 1.5-inch opening for drainage.

At this point the ewe, which was still under the ether anesthesia, was moved to a pen.

After Care.—The following morning she was alive. Since her temperature was a normal 102.4° F., she was simply given 250cc of 25% dextrose into the carotid artery which was struck by accident in an attempt to reach the jugular vein.

For a week the patient's temperature was watched fairly closely. It did not go above a high normal of 104° F. about 8:00 p.m. on the sixth day following the operation. However, because of the known contamination of the peritoneum, 200cc Di-Sulfalac was administered intraperitoneally on the third day following the cesarean section. Penicillin sodium was also administered several times in 50,000-unit doses. Most of this was by intramuscular route, but some was applied topically between the layers of the incision. Before such topical applications the area was cleaned with aromatic chlorazine in low concentration.

On the chance that some deficiency in calcium may have been in part responsible for the ewe going down five days before parturition, she was given two intravenous injections of calcium gluconate of about 200cc each. These injections were stopped both times on evidence of nervous irritability.

This ewe received, over a period of a week, a total of 450cc 25% dextrose intravenously; 300,000 units penicillin sodium, mostly intramuscularly, but some topically, 200cc Di-Sulfalac intraperitoneally; and about 400cc calcium gluconate intravenously. That is a great deal of treatment and expense for a ewe, even for one that survives, but the owner had requested it and was pleased by the improved prospects that the animal would recover.

On the ninth day following the operation the ewe went home. She had been eating well for a week and had been up for short periods for five days. As a result, when the stitches were removed from the skin incision and she was sent home, the prognosis had shifted from unfavorable to rather favorable.

Discussion.—In this case we have only one certainty, namely that the ewe would have died had not the 20-pound, edematous lamb

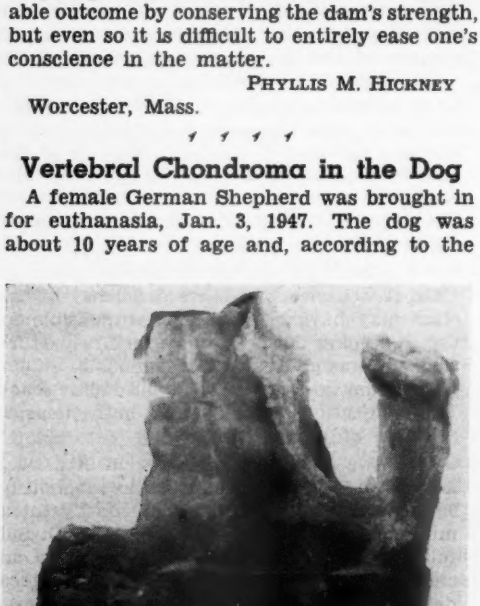
been removed by operation. Beyond that, all is speculation. For instance, did the ether anesthesia given to stop the ewe's struggling in any way conserve her strength? Were the excessive precautions taken to prevent peritonitis justified in the absence of any appreciable rise in temperature, or was the medicine unnecessary? Did synergistic action of penicillin and the sulfa drugs add to her protection? How much value was derived from the topical application of the penicillin? Since in human medicine sulfonamides and penicillin together have been found valuable in cases of peritonitis and topical treatment is recommended, trial of these methods is warranted, but the ewe might have survived without the help of any of them. That the calcium gluconate resulted in no improved locomotion on her part would seem to indicate that it was not needed. One likes to think that the hurried conclusion of the operation without routine aseptic precautions contributed to the favorable outcome by conserving the dam's strength, but even so it is difficult to entirely ease one's conscience in the matter.

PHYLLIS M. HICKNEY

Worcester, Mass.

Vertebral Chondroma in the Dog

A female German Shepherd was brought in for euthanasia, Jan. 3, 1947. The dog was about 10 years of age and, according to the owner, had shown a posterior weakness, with a rounded swelling on the back for three years. In the last three months this swelling had increased in size rapidly.



The tumor extended from the spinous processes into and completely across the spinal canal

Clinically, the animal manifested marked symptoms of posterior weakness and inability to rise from recumbency without assistance. The hard, rounded swelling over the lumbar vertebrae was diagnosed as a neoplasm and a very unfavorable prognosis given the owner.

Light tawny areas of fatty degeneration studded the liver tissue throughout the organ

Euthanasia was performed with 20cc of sodium pentobarbital intravenously and the carcass prepared for autopsy. It was found to be extremely fat. The tumor had developed over the third lumbar vertebra, involving both the spinous process and the body of the vertebra, and extending into the spinal canal where it had almost completely destroyed the nerve tissue. There were grossly, light tawny colored areas throughout the liver varying in size from 2mm to 20mm, which on sectioning and microscopic examination proved to be areas of fatty degeneration. Chronic nephritis, hemorrhagic cystitis and chronic enteritis were also noted.

Microscopic examination of sections of the tumor showed groups of cartilage cells in a homogenous chondromucin matrix. The cartilage was hyaline in nature. Strands of fibrous connective tissue divided the irregular masses into lobe-like areas. The age of the cells ranged from immature to fully mature. From these manifestations a definite diagnosis of chondroma was fully confirmed.

Feldman states that chondromas are very rare in dogs. He further adds that when they do occur they almost always localize in the mammary glands.

References

Feldman, W. H., Neoplasms of Domesticated Animals. W. B. Saunders, Philadelphia and London, 1932, pp. 105-115.

PHILIP HAIMS

San Diego, Calif.

Abstracts

History of Endocrinology

Endocrinology[2] dates from 1891, when Murray demonstrated that extracts of thyroid by mouth cured myxedema. Oliver then prepared an adrenal extract which raised blood-pressure. The isolation of adrenaline soon followed and it was shown that adrenaline was merely the product of the medulla. The discovery of pituitary extract by Schaefer and Oliver gave the final blow to the excretory theory of endocrine glands. The double nervous and glandular structure of pituitary and adrenals was missed for years. The hormone theory was postulated by Starling in his Croonian Lectures in 1905. The name "hormone" was suggested by W. B. Hardy. Soon the integration of the endocrine system was appreciated and Langdon-Brown called the pituitary the "leader of the endocrine orchestra," though later the hypothalamus assumed the more important rôle of conductor. Then the conception arose of the secretion of pituitary cells being modified through the hypothalamus in accordance with body needs. The next advance was in the biochemistry of hormones with the demonstration of the close relationship between the sex sterols and carcinogenetic substances, and the discovery of synthetic hormone-substitutes of simple constitution with estrogenic effect, by Dodds, et al. The surgeons' contributions to the treatment of hyperparathyroidism, hyperthyroidism, adrenogenital syndrome, and later myasthenia (by thymectomy) were noted.

During the last 20 years interest in the subject of "organizers" has increased and Joseph Needham has demonstrated that an "organizer" does not depend on cellular structure. Chemically it is a sterol, allied structurally to certain hormones. Chemical controls exist before any trace of a nervous system has appeared; hormones appear before the glands which house them. The anatomical arrangement of the sympathetic nervous system adapts it admirably to the rapid production of widespread effects. This intimate association of chemical and nervous factors was demonstrated by the work of Loewi and Dale on the cholinergic and adrenergic mechanism. The cause of cancer may be due to the breaking away of chemical growth factors from nervous control. "Delayed fertilization" of amphibian eggs and their production of malignant growth on implantation into adult frogs, revealed a gradual transition from the normal to the frankly malignant which must depend on purely environmental factors. A similar overlap of effect is seen between estrogens and the primary organizer. Waddington and Needham were able to produce secondary neural axes in host embryos by implantation of synthetic estrogenic hydrocarbons. Again the close relationship of vitamin D to the hormones and its effect on growth must be noted. The part played by hormones in physical and psychological manifestations agrees with the present tendency in medicine to adopt a psychosomatic attitude.

[2] Langdon-Brown W. The birth of modern endocrinology. *Proc. Royal Soc. of Med.*, 39:9, pp. 507-510. 1946. Abst. from *Excerpta Medica, Endocrinology*, 1:1. 1947.

Sulfamerazine Therapy in Fowl Typhoid

Sodium sulfamerazine in drinking water or sulfamerazine in mash are effective agents in combating fowl typhoid in poultry, according to Holtman[1] and Fisher, Department of Bacteriology, University of Tennessee.

In experimental studies, relatively large doses of *Shigella gallinarium* were administered to young chicks. Sulfamerazine treatment, started before expiration of the incubation period of the disease prevented its extensive development and reduced the mortality greatly among the chicks.

Although sulfamerazine powder may be administered in mash, the study showed that administration of sodium sulfamerazine in drinking water was the more suitable treatment. The advantage of the latter method of treatment lies in the fact that sick chicks often will drink water when they fail to eat solid feed.

Experiments conducted in the laboratory and clinical studies in the field showed that sulfamerazine therapy is beneficial in controlling fowl typhoid. In clinical studies conducted by the authors at broiler raising plants, 950 chicks were treated with 0.2% sodium sulfamerazine for five consecutive days each month for two months, while 240 birds remained untreated. The mortality rate in the treated group was 4.1%, in the untreated group 61.7%.

This study indicated that when mature birds showing infection by the serum agglutination test were treated by giving sodium sulfamerazine in drinking water for periods of five days once a month for five or six months, many of the birds tended to become non-reactors to the agglutination test. These findings, the authors think, may indicate a solution to the economic problem of disposing of reactor birds from valuable flocks. They feel, however, that it is questionable whether the use of sulfonamide treatment of adult breeding stock is worth the risk of maintaining reactor birds

[1] Holtman, D. Frank, and Fisher, Gladys, *Poultry Sci.* 26, p. 478 (September), 1947.

on the poultry farm during an extended (six month) treatment period.

The evidence of this and other experiments indicates that sulfamerazine and sodium sulfamerazine are highly effective in reducing mortality from fowl typhoid in chickens. These agents, however, should not be relied upon as a solution of the problem which calls for blood testing of breeding stock and removal of reactors and, above all, good sanitary safeguards on the poultry raising premises, the doctors warn.

Measles in Antelope

On routine meat inspection of a large consignment of impala (African antelope) at the Abattoir and Livestock Market, Johannesburg, Union of South Africa, Martinaglia[4] and Branda, found the animals to be infested with the immature systic form of a tapeworm. They were unable to identify the cysticerci as belonging to any named species, and suggest the name *Cysticercus impala.*

Portions of "measly" muscle were fed to a dog but when sacrificed three months later no tapeworms were found, suggesting the dog may be immune to this species of tapeworm.

The authors point out that habits of impala and wild carnivora afford ample opportunity for the propagation of mature tapeworms in the latter and the measles stage in the former.

The Enterotoxemias of Sheep

Lambs and infrequently older sheep suffer from three types of enterotoxemias. All are due to the same exciting cause, present the same symptoms and reveal the same lesions on necropsy.[5] They differ in seasonal occurrence, age of lambs affected and the conditions of feed and management under that predisposes the lambs to attack.

This ailment, or these ailments, if they be regarded as separate entities, have been described in England, Tasmania, Australia, New Zealand, Ireland and in various states in the United States.

That type of the ailment that occurs in suckling lambs in the early spring when they are first put onto lush pasture is often called "pulpy kidney disease." The type appearing in older lambs but which may occur in sheep of any age greater than two months is commonly called "braxylike enterotoxemia." It may occur under differing conditions but is usually seen when the animals are on lush pasture that has grown up after copious summer or late summer rains. The third type of the ailment is the common "overeating disease" responsible for heavy losses in feeder lambs at about the time they are put on full feed.

The disease occurs in four forms: peracute, acute convulsive, acute comotose and chronic. Symptoms are seldom observed in the peracute form of the disease although occasional lambs may be seen to throw back their heads, stagger, fall in convulsion and die in a matter of minutes. In the acute convulsive form affected lambs live a few hours, throwing back the head staggering in a circle, intermittent convulsions and rapid shallowing breathing fill in the few hours between onset of the disease and death of the lamb. In the acute comatose form stupor replaces the nervous symptoms of the convulsive form. Diarrhea, impaired appetite and slow gains characterize the chronic form of enterotoxemia.

If the carcass is examined immediately after the death of the animal the lesions are not conspicuous — epicardial hemorrhages, mild congestion of the abomasum and small intestine, perhaps intramuscular petechiae in the diaphragm and, on sectioning, marked hyperemia of the kidney. An outstanding characteristic of the disease is the extremely rapid changes that occur post mortem. Of these the renal change is spectacular. Within a few hours after death the kidney breaks down into a soft pulpy mass. This was formerly thought to be a pathognomonic symptom and it gave the common name to disease in suckling lambs.

Research has definitely established the biotic cause of enterotoxemia of lambs to be due to *Clostridium welchii,* type D.

It has already been established that lambs can be successfully immunized against the pulpy kidney and braxylike forms of enterotoxemia. The authors undertook an experiment to determine if feeder lambs can be successfully vaccinated against the overeating disease.

The experiment was set up on liberal lines. Approximately 17 thousand feeder lambs were used (8461 vaccinated and nearly the same number of controls) on the premises of 30 lamb feeders in three western New York counties. A formalin treated culture of *Cl. welchii* was employed. The feeders paid for the vaccine and the authors did the vaccination.

The results were encouraging; the losses from enterotoxemia were significantly lower in the vaccinated group than in the nonvaccinated. The authors concluded that the vaccine used is not a practical solution to the problem of enterotoxemia but the experiments indicate that a better vaccine may be the solution.

[4] Martinaglia, G., and Brandt, F. A. Cysticercosis of the impala or rooibok with reference to meat hygiene. *J. South African Vet. Med. As.,* 13:1, pp. 20-27. 1947.

[5] Whitlock, J. H., and Fabricant, Julius. The use of *Clostridium welchii,* Type Danaculture in the prevention of overeating disease (enterotoxemia in sheep). *Cor. Vet.,* 37:3 (July), 1947.

Book Reviews

Heads Up—Heels Down. A Handbook of Horsemanship and Riding. By *C. W. Anderson.* 144 pages, profusely illustrated. Published by the MacMillan Company, New York. Price, $2.50.

This is sort of an orientation course for the beginners on the bridle path—giving names for the parts of a horse, and its equipment, examples of good and bad conformation, colors, markings, customs at horse shows, elementary instruction for riding, etc.

The author claims it is unique in that it contains a chapter treatment of care and handling of the horse by the novice who must be his own groom and stable boy. Persons who are taking up horseback riding for the first time, will like it and learn from it.

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Bright with Silver. By *Kathrene Pinkerton,* author of Wilderness Wife, Three's a Crew, Two Ends to Our Shoestring, etc. 347 pages, 52 illustrations. Published by William Sloan Associated, New York, 1947. Price $3.75.

In this work the author describes the development of Fromm Brothers fur farms, including a biography of the four Fromm boys who started the giant enterprise before they had reached their teens. She has performed her task more than acceptably and in the performance written an authentic and reasonably conprehensive history of fur farming in America.

At the turn of the century four boys, age six to 12 in a pioneer family were already trapping fur bearers in the Wisconsin forest for spending money and had a single wire pen in which to keep a red fox that had been captured alive. Two score years later they owned and operated the largest fox ranch in the world and also the largest mink ranch. Their yearly sales had exceeded two million dollars. The single wire pen had increased to more than 15,000; the quarter-section farm to more than 17,000 acres.

But the part of the work that will interest veterinarians most is the stirring tale of the battles with fox encephalitis and canine distemper on their silver fox ranch. The struggle with these diseases, which more than once came near to writing finis to the enterprise, lasted 12 years and was not won till more than a million dollars had been spent for disease research and losses had been suffered aggregating several times that amount.

Then, as has happened with other farm animals when serious epizootics were eliminated, or brought under control, parasites moved into the disease vacuum and new losses almost as great had to be endured, new methods of combatting them had to be developed and a new war waged—and won.

The story of the discovery and isolation of the virus of fox encephalitis and the development of distemperoid vaccine has been told repeatedly in scientific magazines, including this one, but never before in such detail or in a setting so gripping.

✓ ✓ ✓ ✓

Riding and Schooling Horses. By the late *Brigadier General Harry D. Chamberlain.* 200 pages, 55 plate illustrations. Published by the Armored Cavalry Journal, Washington, D. C.

This work owes its appeal to the reputation of the author, who from the time of his graduation from the Mounted Service School at Ft. Riley in 1915 was almost constantly teaching riding and horsemanship in the army, training U. S. Olympic teams and leading them to Olympic games in various nations or representing the Army in other equestrian events. The number of the latter in which he competed and won in this country and abroad is large.

Any book reviewed in these pages, or any other book if available, may be obtained by remitting the published price to VETERINARY MEDICINE, 7632 S. Crandon Ave., Chicago 49. Bulletins and Circulars should be requested direct from the address given in the notice. Generally they are supplied free unless a price is stated.

The publisher states this work is for the novice and expert alike. We think the latter alone will profit much from reading it, and even he will assimilate all its teachings only by making a career of it. There are brief chapters on seat, hands, aids, saddlery, schooling, and jumping.

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Proceedings of the Moscow Zoological Park. Volume III. By *T. E. Burdelev,* editor in chief. Paper bound, 221 pages, many illustrations and graphs. 1946. No price stated.

Includes articles as follows:

1. Aims of zoological investigations in zoological parks.
2. Changes in plastic characters of the family Characinidae.
3. Action of iron and aluminum on fish.
4. Maintenance of penguins in the Moscow Zoological Park.
5. Horned owls *(Bubo bubo).*
6. The cardiac index of birds.
7. Feeding the fallow deer.
8. The menstrual cycle of catarrhine monkeys.

9. Morphology of the blood of catarrhine monkeys.

10. Helminthoovoscopic diagnosis of echinuriasis in ducks.

11. Diagnosis of Cyathostoma in the emu.

12. Control of ascariasis in large carnivora.

13. Sanitary prophylaxis in zoological parks.

14. Giant cell leucosis in birds.

15. Comparative pathology of tumors in wild animals including birds and snakes.

St. Paul's of I Am; the Father of Jesus Christ. By *Lloyd Champlain,* B.D., D.V.S. Published by the Meador Publishing Company, Boston. 1947. Price $2.50.

This is not the place to evaluate a religious novel, or a work of fiction with a religious background. This one is mentioned because it was written by a veterinarian and is dedicated to the memories of two other veterinarians—"Sesco Stewart and A. T. Kinsley and a few others who were almost as great."

Management and Feeding of Sheep.—By *E. T. Baker.* 396 pages; 101 illustrations. Published by the Orange Judd Publishing Company, New York. 1947. Price $3.50.

This work, by one of the best known of veterinary authors, is strictly a book on animal husbandry intended according to the publisher to meet the needs of the farmer, flockmaster and student of agriculture. It should serve that purpose well. Chapter headings include, ancient history of sheep, breeds, structure, handling, feeding, the farm flock, western range sheep, sheep dogs, poisoning parasites and diseases.

Kennel Building and Plans.—By *Will Judy,* Editor, *Dog World Magazine;* author, The Dog Encyclopedia, Handy Dog Booklets, etc., 4th edition, 94 pages; 76 illustrations. Published by Judy Publishing Company, Chicago. 1947. Price $3.00.

This popular work, unavailable for several years on account of the paper shortages, contains 23 chapters, dealing with the problem of construction, such as fundamentals of dog housing, the location, the foundation, the frame work, the roof, the interior, the equipment, heating, etc. The field is covered for one dog or a hundred and for all breeds. It is a desirable work for any who contemplate constructing a shelter or exercise yard for dogs.

Useful Bulletins, Circulars, Etc.

Streptomycin.—An annotated bibliography. Paper bound; 84 pages. Containing a review of the medical literature on this new and promising antibiotic agent to the end of 1946. Merck & Co., Inc., Rahway, N. J.

Use of Cl. welchii Anaculture in Prevention of Overeating Disease of Sheep.—By J. H. Whitlock and Julius Fabricant, New York State Veterinary College at Cornell University, Ithaca, N. Y. (Reprint from *Cor. Vet.)*

The Origin of Heparin.—An examination of the heparin content and the specific cytoplasm particles of neoplastic mast cells by *J. Oliver,* M.D., *F. Bloom,* D.V.M., and *Carmen Mangieri.* Reprint *J. Exp. Med.,* 86:2, pp. 107-106. 1947.

Hazards of Bovine Tuberculosis as a Matter of Public Health Significance and Potential Lung Infections with Bovine Tubercle Bacilli.—By H. M. O'Rear, B.A.I. Inspector-in-Charge of Field Activities, Harrisburg, Pa. (Reprint from *Diseases of the Chest* 13:4, p. 368. (July-August) 1947.)

Control of Rabies.—Report by the committee on public health relations of the New York Academy of Medicine. A remarkably comprehensive and unprejudiced report on the incidence control measures, state laws enforcement agencies, and state methods, virus research vaccine manufacture, etc. *Pub. Hlth. Rept.,* Vol. 62, No. 34, U. S. Pub. Hlth. Service, Washington, D. C. Price 10 cents.

Manuscript Service, Inc., 642 Cass Ave. Detroit, Mich., has been organized to facilitate publication of clinical and experimental research case records and historical reviews by providing ethical editorial assistance for authors who do not have adequate library facilities available and those whose time is limited. The service is directed by an editor with many years of experience in the preparation and publication of papers and books concerned with clinical diagnosis and therapy, surgery, nutrition, psychiatry, mental hygiene, physiology and biochemistry.

The Vitamin B_6 Group.—Pyridoxine and related compounds. Mimeographed; paper bound; 162 pages. This is another of Merck's annotated bibliographies published periodically to keep readers informed of what is new in the literature on vitamins and antibiotic agents. The present monograph contains brief reviews or pertinent quotations from some 400 articles that have appeared in medical, biochemical, biological, chemical pharmaceutical and nutrition magazines during the past five or six years. The subjects included are: Chemical investigation and description, physiological activity, occurrence, clinical uses, toxic and allergic reactions methods of assay and a list of review articles. Merck & Co., Inc., Rahway, N. J.

Pullorum Disease Studies in Turkeys I.—These studies were undertaken for the purpose of supplying answers to the following questions: (1) How soon after intravenous and oral inoculation with Salmonella cultures can antibodies be detected? (2) How much does the antibody titer vary during the course of infection? (3) How long does antibody production continue? (4) What is the relative value of the standard tube and the whole-blood plate agglutination tests? (5) Does pullorum disease spread among adult turkeys by pen contact? and (6) How long may the pullorum carrier state be continued? By Ruth Corpron, J. A. Bivins and H. J. Stafseth. (Reprint from *Poultry Sci.,* 26:4. (July) 1947.)